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Research was conducted to find the value of an enriched elementary school program for a homogenous grouping of mentally superior students. Studies were carried out with an experimental and a control group to find development in leadership capacity, interests, ability to draw conclusions, artistic ability, and social adjustment. Objective measurements, statistical analysis, ranking procedures, and qualitative observations were used to analyze data. The major conclusion is that the beneficial influence of the program is not identical for each child. The generally negative findings could be due to the measuring instruments employed. Some benefit from the program was revealed after one year. These benefits did not show up, however in the second and third year. The difference between the experimental and control groups, revealed by the instruments, appeared very slight. There is a need for better research instruments and sub-grouping of the mentally superior group into creative and non-creative, and superior and bright.							
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EVALUATION
of
ELEMENTARY SCHOOL
ENRICHMENT CENTER PROGRAM
(Experimental Program #94)

by
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Coordinator
Programs for Exceptional Children

Final Report
to
New York State Education Department

August 1, 1962

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Superintendent of Schools

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WANTAGH PUBLIC SCHOOLS

WANTAGH, NEW YORK

U. S. DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
Office of Education

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CHAPTER I

STATEMENT OF THE PROBLEM UNDER STUDY

Problem: To measure the effect of horizontal enrichment on elementary school children of superior intelligence selected in the primary grades.

- A. We plan to determine whether or not the Elementary Enrichment Program is justified; if not, to explore a more suitable method of meeting the needs of children with high mental capacities.
- B. If horizontal enrichment on the elementary level proves effective in the Wantagh Schools, perhaps this will help other communities to meet the needs of these children.

The following hypotheses state the specific purposes of our study.

General Hypotheses: Children who are of superior intelligence and receive an enrichment program taking five hours per week of school time will differ significantly in their development from children of equal intelligence who do not have the enrichment program.

Specific Hypothesis I: Children in the Enrichment Center Program will develop leadership qualities to a greater degree and also be able to function better as a part of a group than children not in the program.

Specific Hypothesis II: The child in the Enrichment Center Program will have more fully developed interests and more individualized interests than the child not having the Enrichment Center Program.

Specific Hypothesis III: The child in the Enrichment Center Program will be better equipped to make generalizations and to draw conclusions from them than the child not in the Enrichment Center Program.

Specific Hypothesis IV: Artistic production of child in the Enrichment Center Program whether it be in music, graphic art or dance will be of greater quantity and higher quality than that of child not in the Enrichment Center Program.

Specific Hypothesis V: The child in the Enrichment Center Program will be more aware of his responsibility to himself and to society and more willing to give of himself than the child not in the Enrichment Center Program.

Purposes of the Study

Supporting the basic premise that early identification of the mentally superior child is essential, these investigators have attempted in various ways to prove that enrichment of education for the child of high mental capacity will promote the development of creative activity and leadership more than will the education of the same child in the regular classroom. In special education, we provide for the individual differences of the retarded, the brain-damaged and the emotionally disturbed. However, we are not in full agreement as to the necessity for an enriched program of education for the mentally superior.

One of the purposes of this study was to prove that the highly intelligent child, within a small group of his intellectual peers, will benefit from a special program of study in order to bring to complete fruition his inherited gift—that of a superior intellect.

A secondary purpose was to evaluate and improve upon the methods and content of instruction for this particular group of children. Since there is still much educational and psychological theorizing about "how" the intellectually superior child learns, "what" must and can be taught at what grade level and mental maturity level, and "how" to teach and stimulate creative thought and leadership, the teachers believed that they, too, were responsible for a contribution

of ideas in regard to the education of the highly intelligent child. They were aware of the fact that enrichment is not a static activity: It must be related to the individual child's ability, achievement and experiences. In addition, it was recognized that enrichment is always the result of social interaction between the personality of the teacher and the personality of the child.

Therefore, our purpose was not only to evaluate the intellectual benefits that a child might derive from a program of this kind but also to observe the development of the whole child. We had equal interest in his personality development, environmental influences, his modes of adjustment to his peers and to learning difficulties, his over-all school achievement and his interests.

Assumptions and Limitations

The major assumption of this study was that, through participation in the Enrichment Center Program, creative thought and leadership qualities will be developed in the highly intelligent child to a greater and more significant extent than another child of equal ability who remains in the regular classroom. This assumption is made in realization of the problems facing the classroom teacher who is trying to provide enrichment within the regular course of the school day. Among these problems are the intellectual heterogeneity of the class (the gaps become wider with each succeeding grade), inadequate information about pupils in regard to motivation and emotional difficulties, and the lack of certain curriculum skills. In regard to the latter problem, the elementary school teacher is expected to be the possessor of all information and very extensive training.

Secondly, we have assumed that our tests will measure the benefits derived from the Enrichment Center Program. In addition, we have assumed that whatever benefits were derived from participation in this program will be observable in the three-year duration of this research.

Any study involves certain perceivable limitations. At the inception of this experiment, there were certain discernible limitations. These included the short duration of the study, the small number of subjects, and the individual differences of the teachers.

It was noted that the improvement which we were hoping to measure might not show itself until the later development of the experimental subjects. Contact with the children in the Enrichment Center Program was very limited when viewed against a child's total educational hours. Therefore, any resulting differences in favor of the experimental group would be meaningful to the educational process.

Natural limitations impose a restricted number of children in a community who meet the criterion for placement in an experimental program of this sort. Approximately three per cent of the total elementary school population qualified for this study. However, experimental design necessitated the halving of this number in order to have an equal grouping of children who would serve as experimental and control subjects.

Another variable which existed in this experiment was the differences in training, experience, and personality of the individual teachers. In some teachers, an advanced liberal arts education provided the foundation of knowledge for this teaching position, while in others, basic and advanced training was in educational methods and skills. Some are more keenly aware of the needs of this particular group of pupils than others.

One of the biggest limitations of the study was in the intangible nature of what we were attempting to measure and, thereby, the difficulty of measuring accomplishment in certain areas of our original proposal. In the course of time, some of the original hypotheses were excluded from the study because some of the tests we were employing proved to be weak and did not yield the expected types of distribution. Inventories of interests to be completed by teachers

and parents were omitted due to their low reliability. In one instance, instead of elimination of one of the original hypotheses, we approached the study of the trait with the substitution of a new methodology. What was retained was the study of creativity, the study of the child's responsibility to himself and to society, and the study of the child's ability to make generalizations and draw conclusions from them.

Operational Definitions

For the purposes of this study, certain terms must be defined in order to obviate differential understanding of the nature of the present investigation. These terms include: high mental capacities, enrichment, horizontal enrichment, creativity, leadership, responsibility to self and society.

High Mental Capacities. This term relates to the kinds of abilities which are measured by standardized individual intelligence tests such as the Stanford-Binet, Form L-M and the Wechsler Intelligence Scale for Children. The term has the connotation of a small fraction of the total population who have exceptionally high learning ability. This fraction can represent as small a number as 1.5 per cent of the population or as much as 12.5 per cent of those tested with individual standardized intelligence tests in the general population. The number which one considers in this category is dependent upon one's desired cut-off point. These children due to their exceptionally high learning ability have exceptional educational needs. On individual tests, they measure at two standard deviations or more beyond the mean. In measured general intelligence, they differ as much from the average as do the mentally retarded. In studies of intelligence levels within the general population, the mentally retarded and the intellectually gifted have been found to include approximately the same per cent of the total population.¹

¹Thompson, George C., Child Psychology. New York: Houghton Mifflin Company, 1952. p. 387

It is important to think of the intellectually superior as including a range of potential. The "intellectually superior" term is applied to subjects who test well within the top 12.5 per cent of the general population.² In the standardization group of Terman and Merrill, subjects whose I.Q.'s fall within the cut-off points of 120 to 139 are termed "superior"; those subjects whose I.Q.'s fall above 140 are termed "very superior". The latter group constitutes approximately 1.5 per cent of the general population. Those called "superior" represent 9 per cent of the group tested. Pupils with an I.Q. above 125 have been included in this study because of the level of intelligence within the school district.

Terms used synonymously for high mental capacities in this study are mental superiority, intellectual superiority, and, on occasion, intellectual giftedness.

Enrichment. Enrichment is primarily a teaching procedure. Enrichment implies learning situations that will meet the needs of the gifted children and stretch their abilities; it implies a curriculum that is expanded and deepened to fit their patterns and levels of abilities. Enrichment, in other words, is the core of the program for educating gifted children. Simply stated, enrichment means more opportunities for the gifted child to go deeper and to range more widely than the average child in his intellectual, social, and artistic experience. It is a matter of quality rather than quantity.

²Terman, Lewis M. & Merrill, Maud A., Stanford-Binet Intelligence Scale, Manual for the Third Revision Form L-M. Boston: Houghton Mifflin Company, Riverside Press, 1960. p. 18

Horizontal enrichment. "Horizontal" enrichment involves a broader understanding of regular studies for more capable students. It may be visualized like this:

Horizontal Enrichment	Regular Grade Level Program	Horizontal Enrichment
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It emphasizes learnings directly related to the regular program; however, children would not proceed to advanced material if they learned at a more rapid rate. A first grade child who had achieved mastery of addition factions with sums through 8 would not be taught his 9's if these sums were normally taught in second grade. He would use the sums he did know in a greater variety of situations.¹

The Enrichment Center Program offered many opportunities for creative writing, oral expression and wider reading in the coverage of the language arts curriculum. In creative arts many and varied art media were used. Experiences were those which the classroom could not offer because of its limitations. Art and music appreciation were areas in which breadth and depth were experienced. Creative dramatics offered many opportunities for creative activities not possible within the regular classrooms.

In the area of art of living were included mathematics, science, and citizenship education. A great variety of number games and brain teasers were employed in mathematics; many science experiments were conducted; and, perhaps, most important of all, opportunities were given for self evaluation, group evaluation, and critical analysis in the area of citizenship education. "Words of Wisdom" were imparted to members of the ECP groups by their intellectual peers as the need arose. These words pointed out to the delinquent member his

¹Durr, William K., "Dimensions of Enrichment", *Exceptional Children*, Vol. 26, No. 4, Dec. 1959, p. 203.

inadequacies of behavior and shortcomings. This was to bring to the group an awareness of responsibility to self and society.

Creativity. In the original design of the experiment, a creativity score was obtained from the total rating an individual received in an artistic production task. These ratings proved to be unreliable and the task, itself, was found to be too limiting for those with no artistic talent. Thus, this instrument for evaluating creativity was omitted from the research design.

However, we adopted a new evaluative procedure this year and employed this term in ranking the experimental subjects in respect to degree of originality and amount of contribution of fresh new ideas to the Enrichment Center Program classroom.

The other instrument which tapped one factor of the many considered to be responsible for the creative product was The California Test of Mental Maturity, subtests 7 and 8, which provided a measure of the evaluative ability of each subject. It assessed the individual's ability to make generalizations and to draw conclusions from them.

Leadership. A measure of leadership was obtained for each subject by means of a sociometric instrument which gave a selection-rejection score. However, this test proved to be defective in that it assumed that socio-centrality would be coincident with leadership.

Responsibility to self and society. This trait was assessed by a projective test called, "This-Is-You," devised for the purposes of this study by Dr. Loron Simon and Mrs. Beverly Rich. We used this terminology once more in a ranking of the Enrichment Center Program students by their teachers and the research psychologist.

Review of Related Research

Education. Early identification of the highly intelligent child is essential. To substantiate this premise, the following excerpt is quoted: "In deciding the age and identification and resultant special provisions for the gifted, it is well to recall that the educational needs of the intellectually gifted are not limited to certain grade levels, but they exist throughout the grades (Witty, 1951)." Hollingworth and others have pointed out that the early grades are actually the time of greatest need for the gifted child.

Gallagher's studies (1960) in Illinois support the value of adjusting the learning environment of highly intelligent children in grades two through five by means of enrichment. In his research, he pointed out the problems facing the teacher in the regular classroom. Intellectual heterogeneity, inadequate information about pupils in regard to motivation and emotional problems, and lack of curriculum skills and specialized information and training are among these problems. DeHaan and Havighurst (1961) have stressed the rewards of enrichment.

Responsibility. D. B. Harris (1957) reported on a scale of social attitudes designed to discriminate children who have with their peers a reputation for responsibility as contrasted with children who have little reputation for responsibility. Subjects were seventh- and eighth-graders. The scale yielded correlations of .34 to .49 with other measures of personal and social adjustment. A positive trend was demonstrated in mean score with increasing age and this was exhibited with the major proportion of items which referred to social and societal obligations and not with highly personal items. It was postulated, therefore, that attitudes toward the community, society, and human relationships are, in general, modified by education, experience and maturity, but self-attitudes and personal habits are more resistant to change.

Creativity. Can creativity be measured? Creativity as a descriptive concept is quite old but only recently have psychologists begun to systematically study

its nature. In 1951, Thurstone pointed out the lack of identity between academic intelligence and creativity and related creativity to ideational fluency, inductive reasoning and certain perceptual and temperamental tendencies.

A variety of investigations have attempted to discover the characteristics involved in the creative process. Ghiselin (1955) has reviewed introspective accounts by creative persons themselves, Murphy (1958) has made biographical studies of such persons, Guilford (1959, 1960) has used a factor-analytic approach, and Torrance and his associates (1960, 1962) have developed and revised a battery of creative thinking tasks which appear to tap the sources of Guilford's identified "primary abilities."

In the study of his intellect model, Guilford has pointed out that some factors previously thought to be only involved in "convergent production" also make their contribution to what is considered to be most closely related to creativity and that is, "divergent thinking." Some of the factors which Guilford believes to be most responsible for the creative effort include: reasoning factors; sensitivity to problems, both of a perceptual and thought quality; fluency factor; ideational novelty; flexibility of mind—the ability to change set; synthesizing ability; analyzing ability; redefinition of organized wholes; degree of complexity or intricacy of conceptual structure attainable; and evaluation ability. Guilford's research on creativity has been done most extensively on the highly intelligent.

However, the recent work and findings by Getzels and Jackson (1962) agree with Torrance's opinion that there is a low positive correlation between I.Q. and creativity. The Chicago study has shown that creativity is related to achievement but not to I.Q. Karnes (1962) found that the over-achievers in her study scored significantly higher on two creativity tests than the under-achievers of the same intellectual ability.

CHAPTER II

DESCRIPTION OF THE WORK IN THE THREE-YEAR PERIODThe Subjects

Wantagh is a suburban community on Long Island having a population of approximately 30,000 - with a slightly above average socio-economic level.

In a recent survey of citizens' opinions, a study to ascertain practices, conditions and other considerations believed by citizens to be associated with the Wantagh Schools, 36.5 per cent of the citizens completed the questionnaire. Of the 1,112 respondents, 6.8 per cent reported they had completed the eighth grade; 53.1 per cent twelfth grade; 40.1 per cent college.¹

There were two hundred and thirty different occupations reported for 671 men. It was noted that 65 per cent of the men of this group are employed as engineers, salesmen, managers, or accountants.²

The sixty boys and girls who were involved in the experimental and control groups of this study were pupils from four elementary schools in Wantagh. The enrollment in Kindergarten, grades 1, 2, 3, 4, and 5 from which these children are drawn is 2,446. This percentage of pupils in the experimental program did not exhaust the population of children of these grade levels who could meet the criteria for experimental inclusion. However, the quota for the Enrichment Center Program instructional groupings necessarily limited the number of subjects for this study. Moreover, five subjects of the original 38 participants were omitted from the study due to a move from the district or for other reasons.

¹Lawrence, William F., "Survey of Citizens' Opinions," Wantagh Public Schools, Wantagh, New York, 1957, p. 5.

²Ibid.

At the inception of this study in 1959, children were referred, as possible candidates for this experimental program, when they were enrolled in kindergarten, grades 1 and 2. They were identified through the observation of teachers or other school personnel or on the basis of superior scores on group achievement and/or intelligence tests. After being screened (cf. Progress Report, July 1960), these children were given an individual intelligence test, the Wechsler Intelligence Scale for Children or the Stanford-Binet Intelligence Scale, Form L-M. All students participating as experimental or control subjects obtained an intelligence quotient of 125 or over. The range of I.Q. scores in this study is from 125 to 169.

Believing, as we did, in early identification of the intellectually superior child, the original experimental group was expanded in the final year of this study to include those children in the kindergarten, first and second grades who met the criteria after the screening process. There were, therefore, ten new children added to the experimental and control groups with the two kindergarten children placed in the experimental group. In the final analysis, there were 26 control subjects and 29 experimental subjects.

Program of Instruction

The children participating as subjects of the experimental group in this study attended the Enrichment Center Program (ECP) for one hour daily, five days a week. Prior and subsequent to ECP, their school day was spent in their regular classroom with their classroom teacher. During the first two years of the experimental program, one teacher taught the primary group. Following a two-year analysis of the research findings, team teaching was established for the original and aging primary group and the newly-identified primary group was taught by a single teacher. Thus, in the latter half of the study, intermediate grade groups were taught by four different teachers who represented strengths in

the areas of language arts, creative arts, mathematics, science, and citizenship education.

The specific aims of the curriculum in the Enrichment Center Program included:

1. Development of leadership and followership qualities:

The ECP student must utilize his capacity for critical analysis in determining whom to follow, whose ideas are false and unacceptable, and which courses of action are the most sound. He should, at times, display leadership qualities.

2. Development of individual interests and of social awareness through independent activities and through group experiences:

By allowing the child to work independently in the areas of his special interests, we can encourage him to use the initiative and originality with which he has been endowed. By working in a group situation, he can develop tolerance, patience, courtesy, respect for talents of others.

3. Development of ability to make generalizations and to draw conclusions:

By extending the sphere of activity from the ECP classroom into the total school program and community, we will give students first-hand experiences which will furnish an experiential background.

4. Development of unknown gifts:

Through broad experiences and the use of varied media, latent special interests and talents can be discovered and encouraged.

5. Development of known talents:

By using consultants, varied materials and a variety of experiences, we can develop special talents.

6. Growth in ability to think: to plan, execute, evaluate; to utilize critical analysis and original thinking; to practice the scientific method of attacking problems.

By providing opportunities to experiment; to discuss current events; to plan for group activities; these mental abilities will be developed.

7. Growth in awareness of responsibility to self:

The ECP student must be guided to use his abilities in analyzing and meeting his social and emotional problems and in achieving all-around development.

8. Growth in awareness of responsibility to society:

The ECP student must be guided to realize the value of the full development of his potentialities for his own happiness and the welfare of society, and to develop a wholesome attitude toward his own gifts and the abilities and interests of others.

Among those activities and experiences which were to assist in the fulfillment of the aforementioned objectives were those listed below and divided into primary and intermediate groupings.

Primary Group

The activities of this year consisted of those endeavoring to:

1. Make children aware of environment.
2. Sensitize children to individual differences.
3. Develop creative expression in thought, action, art, music, and dramatics.
4. Expose children to the "structure" of art.

This year's curriculum covered these activities:

1. Explore school
2. Use of five senses
3. Let's pretend
4. Take a Sensible Trip
5. Use  in interesting designs
6. Mental gymnastics
7. Interpretation of music
8. As quiet as
9. Use of mathematical instruments
10. A. A. Milne
11. Scientific principle -- water cycle
12. Ways nature provides for protection of animals
13. Imaginative animals
14. Shadow plays
15. Words of Wisdom
16. Could we go to Mars?
17. Dr. Seuss stories
18. Fairy tales
19. Numbers as human personalities
20. Pinhole doodles
21. What's in a name?
22. Pantomime
23. Cuisinaire rods
24. Illustration of America
25. Creative songs

26. Trip to woods
27. Imaginative stories
28. What causes sound?
29. Story -- All About Us
30. Working with a bioscope
31. Art Structure
 - A. Form
 - B. Color
 - C. Line
32. Carnegie Hall

More extensive were the activities and experiences of the intermediate group which included:

1. School Math Study Group Curriculum - basic mathematical concepts to stimulate inductive thinking
2. Medical research paper
3. Science and superstition
4. Optics study
5. Preparation of slides
6. Microscope study
7. Current science discussions
8. Trip to county health department
9. Chemistry lab at high school
10. Chemistry demonstrations and experiments
11. Discussions and readings in "Brave New World"
12. Weather station
13. Source readings Aristotle, Hippocrates, etc.
14. Subscribed to and used the Herald Tribune and/or N. Y. Times for the development of vocabulary, an awareness of current events, increased knowledge of geography, accumulation of background material for greater subject area coverage.
15. Debates and group discussions
16. Talk given by Mr. M. Zederbaum (N. Y. Times) - how to read a newspaper
17. Wrote, evaluated and discussed editorials and news articles
18. Made glass slides of maps
19. Discussion and use of maps and globes
20. Study of American Indians
21. Indian music and art work
22. Indian myths and legends -- read and wrote original
23. Trip to N. Y. Museum of American Indian
24. Trip to N. Y. Museum of City of N. Y.
25. Research projects on American Indians
26. Study of mythology of: Japan (and art techniques)
 - Celts
 - American Indians
 - Fairy Lore (music lesson on tyll Eulinspeigal)
27. Creative dramatics
28. Discussions of important dates and holidays in American History
29. Study, discussion, debates and individual research projects on origin of World War II
30. Study of great leaders in America
31. Crossword puzzles

32. Legends of King Arthur - research papers
Wagnerian opera "Parsifal"
33. Creative writing - prose and poetry
34. Study and discussion of documents and quotations in American History
35. Talk given by Mr. Donald Knies - description of travels in foreign lands
36. Talk given by Mr. Alex Mulligan - a lucid explanation of what makes people different, with an aim to the understanding of prejudice.
37. Japanese poetry forms
38. Listening to and discussing American poetry and poets

Creative Arts

1. Painting to music
2. Attendance at Carnegie Hall
3. Study of composers
4. Interpretation of quotations
5. Foil designs
6. Stabilis
7. What if . . . questions
8. Designs from five basic lines
9. Interpretation of proverbs
10. T conversions
11. Interpretation of "Pictures at an Exhibition"
12. Strip animals
13. Art expressions of scientific principles
14. Animal Farm - Grade 6
15. What are Winslow Treadwell's characteristics? Grover Granstrom's?
16. Sculpting
17. Creative process
18. Scientific process
19. Jazz
20. Individual projects

The Research Design

In the past three years, the general design of this experiment has remained the same as the original proposal but certain changes have been effected in regard to evaluative instruments and three of the original six hypotheses have been omitted from the study. These alterations and omissions have met with the approval of our advisors in the State Education Department.

Procedure

After identification of the children to be included in this study, these pupils, having been matched for age, sex, and I.Q., were divided into two groups. One of these two groups was to be the experimental group, the other group was to be the control group. A toss of a coin by the principal of the district

Sources of Data

In order to determine whether or not any significant changes had taken place within or between the control or experimental groups, certain measuring instruments were employed. Upon the advisement of our statistical consultant, the tests for creativity and leadership were eliminated from the battery of instruments used to test the experimental hypotheses. The instrument which was devised to measure a subject's creative and artistic ability and the sociometric questionnaire were omitted from the final experimental year because they did not yield the expected types of distribution and were found to be weak in respect to their validity (cf. Chapter III, Progress Report, August 1961). Those objective instruments retained were the test for measuring responsibility to self and society and the test which evaluated the subject's ability to make generalizations and draw conclusions from them.

Other evaluative devices were employed initially, such as interest inventories and child and parent evaluations, but they were excluded very early in the study for lack of objectivity and validity of measurement.

During this final year, more intensive classroom observation of all experimental groups by the psychologist was included as part of the experimental methodology. This was to serve partially as a substitute for our omitted tests and, in addition, to provide a qualitative measurement of leadership, creativity, and personality. ECP teachers participated in these evaluations also. Further evaluations were arrived at by analysis of school grades, standard achievement test results, and information gleaned from parent-teacher conferences.

Description of Objective Instruments

The instrument for measuring a child's responsibility to himself and to his society was a projective test devised for the purpose of this study entitled "This is You." This test was administered individually to a random sampling of children in the second grade and in group form to the entire third and fourth

grades. The original primary groups of this study received administration of this test four times in the course of the experiment -- once at the beginning of the first experimental year, in the middle and end of the second year, and the end of the third year. However, the new primary group took this test only twice; once in November 1961 and again at the end of May 1962.

The test consisted of two different forms, one for boys and one for girls (see Appendix A), in order to make it easier for them to project themselves into the pictures.

All children were given the following directions before proceeding with the test:

These booklets contain pictures of boys and girls just like you, who do the same kind of things that you do. In each picture there is one boy or girl that I want you to pretend is you. You are to write (or, when administered individually, you are to tell) how that child feels, what he is thinking, and what he will do. In this first picture, this is you. (Examiner points to child in picture.) How would you feel, what would you think, and what would you do? (Examiner repeats these last two sentences before proceeding with each of the remaining pictures.)

In order to insure that each subject was responding to the same set of stimuli, the above directions were supplemented by the following explanation:

Picture #1 - This is you sitting in the audience.

Picture #2 - This is the teacher giving the children back their test papers. This child got 100 - he got them all right, and this child got 50 - he didn't pass the test. Now we are going to pretend that you are the child who got 100. How would you feel, what would you think, and what would you say to the child who got 50?

Now we are going to pretend that you are the child who got

50. How would you feel, what would you think and what would you say to the child who got 100?

Picture #3 - This is you, and these children are teasing you.

Picture #4 - This is you, and these children want you to come and play ball/house (depending on whether boy or girl) with them.

Picture #5 - This is you playing the piano.

Picture #6 - This is the good humor man and this is you.

Picture #7 - This is you coming out of the toy store.

In order to obtain a measure of the subject's ability to make generalizations and draw conclusions from them, the logical reasoning subtests 7 and 8 of the California Test of Mental Maturity, 1957 Edition, were administered. One of these subtests was from the language section and the other was from the non-language section.

Non-Test Measurement

The research psychologist carefully studied the experimental groups and, in particular, individual children -- those who had shown a great deal of progress in the areas tested and those who had shown limited growth in these areas. Personality dynamics, environmental and hereditary influences and school achievement records were analyzed for possible insights into the "whys" and "hows" of creative learning.

In addition, the three teachers and the psychologist independently evaluated the children of the experimental group in both creativity and responsibility to self and society. This evaluation was done by a ranking method and by grade groupings. The ranking was done on individual forms for both traits to be evaluated in order that a certain "halo" effect would be removed, i.e., by separating one child's position in relation to his age peers on one trait from his position on the other characteristic, we eliminate the possible influence of

one trait over another. An assumption was made and later statistically tested that there would be little positive correlation between the trait of creativity and that of responsibility to self and society.

The directions for this ranking procedure follow:

You have worked with ECP children for at least a year and have, no doubt, made some evaluations of the children in respect to the kind and amount of work produced for you in your subject areas and in regard to their character. Having statistically analyzed the results, I would appreciate your further efforts in this research for the purpose of, perhaps, supporting some of my statistical findings with your classroom observations.

In respect to degree of originality and amount of contribution of fresh, new ideas to the ECP classroom, please rank the following groups of children by giving a number 1 to the best member of the group, number 2 to the next best and so on. If two or more children are equal in the degree and amount of creativity displayed in your subject areas, assign them the same number.

In regard to their developing sense of responsibility to themselves and others, consider which children have revealed the most favorable progress in the development of this trait and assign them the highest rank in their group and, accordingly, assign the higher numbers (corresponding to a lower rank) to those children in each group who compare less favorably with the former children and, thus, have demonstrated the smallest amount of responsibility to themselves and society. However, in evaluating this trait, you may find it necessary to assign a greater number of equal ranks, since the trait of responsibility to self and others is less easily observed than the products of creative endeavor in the classroom. Please be conservative in your assignment of tied ranks. Too many tied ranks indicate little difference between the children and give me very little information.

The third, fourth, and fifth grade ECP groups were rated by all three teachers and the psychologist. Since the new primary group had only been worked with and observed by the principal investigator and the psychologist, there were only two evaluations made of these younger subjects.

Statistical Analysis

Statistical treatment included tests for significance of differences between experimental and control groups on the two objective instruments. Non-parametric statistics were employed in the analysis of the test data. We did not expect, in view of the nature of our groups, to find a normal distribution of test results. In addition, there was doubt, after evaluating our measuring instruments, that interval scaling had been achieved and this would be a tenuous assumption to make. Therefore, since there was no difference in power-efficiency and no question that ordinal scaling was achieved, it was decided to use non-parametric ranking procedures.

The Mann-Whitney U-test was applied to data derived from the projective test, This Is You, and the Logical Reasoning subtests of The California Test of Mental Maturity. This statistical test is one of the most powerful of the non-parametric tests when one wishes to avoid the t-test's assumptions. In addition, it was chosen because this study employs two independent samples, contains small samples, and uses measurement, which we can assume is in an ordinal scale.

The Spearman rank correlation was used to test for some possible interesting relationships in the ranking of the experimental subjects by the teachers and the psychologist. It was employed with the thought that we might find some information which we had not expected to find.

CHAPTER III

ANALYSIS OF THE DATAPrevious Years' Findings and Conclusions

In the first two years of experimentation, certain deficiencies were revealed in some of our measuring instruments and evaluative devices. The teacher rating scales, the parent and child evaluations, and the interest inventories demonstrated a lack of objectivity and low reliability. The sociometric questionnaire, initially employed to measure the selection-rejection status of each subject by his classmates, did not yield the expected types of distribution for the experimental and control groups. Although an interesting trend was shown towards greater variability in the degree of acceptance in the control group and less variability with increased acceptance in the experimental group, neither the acceptance or rejection means nor the variability differences in these two scores displayed any statistically significant differences between the experimental and control groups.

The instrument used to measure artistic creativity was found to be impractical for the purposes of our research. It penalized, too heavily, the children of the intermediate grade levels, who felt the need to represent reality and were not equally successful, as their younger counterparts, in the production of art work which demanded a departure from reality in order to achieve an original and creative result. Moreover, this measurement of creativity seemed to be too dependent upon artistic talent. Since the aforementioned measuring instruments were found too weak and were not yielding the expected distributions, they were excluded from the final phase of the study.

Those tests which were retained in the final experimental year were the projective test and the Logical Reasoning subtests of the California Test of Mental Maturity.

The Projective Test

Scores were obtained for the projective test by means of a 5-point rating scale (see Appendix B). The psychologist who rated each test was unaware of the subject's identity until the scoring was completed. In the first year of this experiment, two psychologists rated each projective test independently. Finding high agreement (correlations ranging from .86 - .91) between the psychologists' judgments, it was decided that the use of one rater's score for each subject would be sufficient for statistical analysis of the data.

The first year's analysis revealed a statistically significant difference between the mean scores of the first and second grades, but no difference between the second and third grade mean scores. Upon analysis of the second year's data, a statistically significant difference in mean scores between the third and fourth grades, and between the second and fourth grades was found. In 1960, the control group showed a significantly greater variability over the experimental group.

The California Logical Reasoning Test

After both the first and second year of study, a t-test applied to mean scores and variability derived from total raw scores on two subtests of the Logical Reasoning Section of the California Test of Mental Maturity demonstrated no statistically significant differences between the control and experimental groups. However, in 1960, there was a trend toward greater variability in the control group which did not quite reach the 5 per cent level of significance.

Analysis and Presentation of Findings for Total Experimental Period

The Projective Test

The statistical analysis of scores on the projective test (This Is You) included data obtained not only during the past year, but also from previous years. To eliminate testing for initial equivalence of experimental and control groups on the variable of responsibility to self and society, improvement scores constituted

the data under analysis. These improvement scores were nothing more than difference scores which reflected the change in score from one testing to another.

As previously mentioned, the test employed was the Mann-Whitney U Test (as described by S. Siegal)¹, a non-parametric technique with high power-efficiency which is used to test for differences in central tendency between two independent samples. The appropriate corrections for tied ranks were employed when necessary. Four tests were carried out on these projective test data. The null hypotheses for these tests were:

- a) H_0 : There is no difference between the experimental and control groups in responsibility to self and society (as measured by This Is You) after one year of participation in ECP by the experimental group. In this case, one year refers to the first year in ECP, regardless of the specific date of admission into the program.
- b) H_0 : Under the same conditions, there is no difference between the groups after two years in ECP.
- c) H_0 : There is no difference between the groups after three years in ECP.
- d) H_0 : Considering only those children whose scores reflected substantial improvement over three years, there is no difference between the experimental and control groups. Here, only five experimental subjects and six control subjects (number differs due to a tied rank) were considered.

Table 2 presents a summary of these tests, while Appendix C lists improvement scores and their corresponding ranks. Of the first three tests described above, none was found to be significant. There are three possible explanations for these negative results:

- 1) The projective test is not a valid measure of responsibility to self and society;
- 2) The ECP curriculum does not stimulate or influence the development of a greater sense of responsibility to self and society any more so than the regular classroom in which the controls remained;

¹Siegal, Sidney, Non-Parametric Statistics for the Behavioral Sciences, New York, McGraw-Hill, 1956. pp. 116-127.

- 3) The reliability of the test scores may be called in question, since these scores were not all obtained under testing of the same examiner, nor were they scored by the same raters. This is due, mainly, to the fact that three different psychologists have been employed during the initial, middle, and final phases of this pilot experiment.

TABLE 2
SUMMARY OF RESULTS WITH MANN-WHITNEY U-TEST APPLIED TO
PROJECTIVE TEST IMPROVEMENT SCORES

Test	Number of Subjects		U	Z	P
	Control	Experimental			
One year improvement	28	30	-	.48	.32
Two year improvement	17	19	160.5	-	-
Three year improvement	15	17	125.5	-	-
High degree improvement	6	5	1.0	-	.004

It is believed, by this writer, that the absence of significant findings is due to deficiencies in the measuring instruments rather than in the program itself. Although the projective test has face validity, this is meaningless without some proof of a reasonably high concurrent validity. It may be suggested that in future work directed toward measuring such qualities as responsibility in children, more attention be focussed on more objective validation of evaluative instruments. Obviously, the most difficult problem, in this regard, would be in the identification of the criteria against which the instrument was to be evaluated.

The final test, that between the "high improvers" in both groups yielded a highly significant difference in favor of the experimental subjects. It was not true, however, that those who showed negligible improvement were distributed unequally in the two groups. Since the Mann-Whitney U test is essentially a test

of median differences, this significant finding regarding sub-samples would reflect a difference in variability in the total samples. It is very possible that ECP may stimulate only certain children in the development of a sense of responsibility to self and society, but stimulate these children to a high degree.

The Logical Reasoning Tests

Two sub-tests of the Logical Reasoning section of the California Test of Mental Maturity were used to attempt measurement of at least some components of creativity, i.e., the ability to make generalizations and to draw conclusions from them. A certain amount of manipulation of these data was necessary before they could be analyzed. Since percentile norms were available only for the complete Logical Reasoning Section, these could not be used for only two of the four sub-tests. In addition, since many of the subjects were tested once or twice with the primary form (total possible score - 24) and a third time with the elementary form (total possible score - 30), raw scores would have been inadequate for analysis. Therefore, each score from the California tests was transformed by computing a ratio, i.e., by dividing the actual score by the total possible score. Such a transformation probably resulted in some inaccuracy, but, to be sure, not such grave error as would exist by not considering this change of test forms with increasing age or grade level.

The null hypotheses tested by means of the Mann-Whitney U test included:

- 1) H_0 : After one year in ECP, there is no difference in improvement scores of the experimental and control groups on the two sub-tests which measure the ability to make generalizations and to draw conclusions from them.
- 2) H_0 : Under the same considerations, there is no difference between the groups after two years of the experimental program.

A summary of the results is presented in Table 3, and improvement scores and ranks are listed in Appendix D. While the difference in two-year improvement is not significant, the difference in one-year improvement is significant at the .05 level. It is possible that ECP provides its greatest benefit in the earliest

school years of each child. If such is the case, it would be of value to attempt to discover what is the optimum length of time for a child to participate in such a program before diminishing returns are noted. Perhaps the reason for this difference is primarily age. This particular reasoning parallels the belief of many investigators in the area of education for the gifted that younger children of high mental capacity benefit more substantially from an enrichment program such as that provided in ECP than older children with the same intellectual capacity.

In the past two years, the teachers involved with the Enrichment Center Program have felt strongly that the original curriculum was not equally well-suited for all age levels. Therefore, some curricular ideas were discarded, some retained, and some expanded in an effort to provide a program which would be as provocative and challenging to the older ECP pupils as well as the younger pupils. Appendix E represents the latest revision of the ECP curriculum with specific aims, disciplines, concepts, experiences cited for kindergarten and grades 1 through 6.

It is important to remember that the measuring instrument (Logical Reasoning Tests of the California Test) does not assess creativity per se but, at most, two factors which Guilford has identified as important in the creative process.¹

TABLE 3

SUMMARY OF RESULTS FOLLOWING APPLICATION OF MANN-WHITNEY U-TEST
TO IMPROVEMENT SCORES ON THE LOGICAL REASONING TESTS

Test	Number of Subjects		U	Z	P
	Experimental	Control			
One year improvement	28	28	-	1.63	.05
Two year improvement	16	14	105.5	-	-

¹Guilford, J. P., & Merrifield, P. R., "The Structure of Intellect Model: Its Uses and Implications," Reports from the Psychological Laboratory, The University of Southern California, No. 24, April 1960.

Along with testing for differences between experimental and control groups, it was felt that it might be valuable to attempt to evaluate the objectivity with which raters could judge both creativity and responsibility to self and society in the ECP pupils. If these concepts have the same meaning for raters, high correlation between raters should result. High correlation would not, necessarily, imply objectivity, but if raters do agree, we would know that such evaluations are not completely individual or subjective. Therefore, the three ECP teachers and the psychologist were asked to rank different groups of children (grouping based on grade levels) in respect to creativity and responsibility to self and society, and Spearman rank difference correlation coefficients (with correction employed for tied ranks) were computed. The groups under consideration were kept small, since the raters felt that it was an almost impossible task to rank all grade levels together.

In the following tables, Groups A and B are fifth-graders, Group C refers to a fourth grade group, members of Group D are third grade children, while second-graders constitute Group E, rankings on whom were made by a single teacher and the psychologist, since the other two ECP teachers had had limited opportunity to observe the younger experimental group. Table 4 lists the intercorrelations between the raters for the responsibility criterion and includes correlations between raters and final This Is You scores obtained by the experimental subjects.

TABLE 4

INTERCORRELATIONS BETWEEN RATERS AND TEST SCORES ON
RESPONSIBILITY TO SELF AND SOCIETY

GROUP A	N = 8	Raters			
		H	K	S	P
H					
K		.36			
S		.53	.50		
P		.74*	.83**	.58	
Projective Test		.41	-.09	.66	.27

Table 4 continued on the following page.

TABLE 4 (cont'd.)

GROUP B N = 6

	Raters			
	H	K	S	P
H				
K	-.50			
S	.49	.30		
P	.94**	-.50	.49	
Projective Test	.03	.44	-.12	.09

GROUP C N = 6

	Raters			
	H	K	S	P
H				
K	-.49			
S	.20	.35		
P	.38	.12	.94**	
Projective Test	.44	-.13	.67	.58

GROUP D N = 5

	Raters			
	H	K	S	P
H				
K	.05			
S	.15	.18		
P	.60	.36	.46	
Projective Test	-.79	.46	.11	-.05

GROUP E N = 8

	Raters	
	H	P
H		
P	.63	
Projective Test	-.38	-.23

* Significant at .05 level

** Significant at .01 level

In general, the correlations in Table 4 are low but positive, only 5 of the 43 correlations being significantly different from zero correlation.

Table 5 lists intercorrelations between raters for the creativity criterion and includes the California Logical Reasoning Test Scores.

TABLE 5

INTERCORRELATIONS BETWEEN RATERS AND CALIFORNIA TEST SCORES ON CREATIVITY

<u>GROUP A</u>		N = 8		Raters				
				H	K	S	P	
	H							
	K			.57				
	S			.35	.41			
	P			.24	.67*	.54		
California Test				.66*	.25	.82*	.32	

<u>GROUP B</u>		N = 6		Raters				
				H	K	S	P	
	H							
	K			.88*				
	S			-.61	-.55			
	P			.72	.96**	-.37		
California Test				-.17	-.46	.54	-.07	

<u>GROUP C</u>		N = 6		Raters				
				H	K	S	P	
	H							
	K			.46				
	S			.58	.12			
	P			.75	-.03	.89*		
California Test				.18	.93*	.06	-.19	

<u>GROUP D</u>		N = 5		Raters				
				H	K	S	P	
	H							
	K			.21				
	S			.74	.08			
	P			.30	.67	.68		
California Test				-.11	.68	-.56	.11	

<u>GROUP E</u>		N = 8		Raters	
				H	P
	H				
	P			.36	
California Test				.61	.04

* Significant at .05 level	
** Significant at .01 level	

Again, these correlations are mostly low but positive, only seven being significantly different from zero. There is little that is consistent or meaningful in Tables 4 and 5 and the general conclusion could be made that even raters who have seen these children for a year or more are unable to agree on their relative creativity or responsibility. It is no small wonder, therefore, that there is difficulty in developing objective instrumentation for the measurement of such personal qualities.

In respect to creativity, it must be remembered that each teacher-rater evaluated each child on the basis of performance in her own subject areas and we cannot assume that a child who is creative in one area will display equal originality in other curriculum areas. However, we might expect a larger degree of relationship than that shown by our analysis of the ranking data.

Finally, it was decided to compute intercorrelations between the two traits. This analysis would demonstrate the degree of association between creativity and responsibility for each rater considered separately. Table 6 presents the Spearman rank difference correlations for these evaluated qualities.

TABLE 6

INTERCORRELATIONS FOR CREATIVITY AND RESPONSIBILITY
TO SELF AND SOCIETY FOR INDIVIDUAL RATERS

	Raters				Tests
	H	K	S	P	
GROUP A (N = 8)	.71*	.61	.48	.62	-.04
GROUP B (N = 6)	-.54	.86*	.16	-.58	.20
GROUP C (N = 6)	.60	.03	.89*	.76	.50
GROUP D (N = 5)	.10	.89	.86	1.00*	.31
GROUP E (N = 8)	.16			.36	-.22
* Significant at .05 level					

Once again, there seems to be little relationship indicated by the statistics between the two personal qualities of creativity and responsibility to self and society. In surveying Table 6, we note that, for each rater, a significant correlation existed between his rating of responsibility and creativity for one of the five evaluated groups. We see this clearly in the perfect correlation between the two qualities for Group D as ranked by the psychologist. The inter-correlations between scores on the two tests were low, especially for the youngest group.

Supplementary Information

Another area of investigation was attempted in the second term of the school year and that was the introduction of the School Math Study Group Curriculum to two ECP instructional groups. It represented an effort to give these elementary school children a new depth of understanding of the number system. By way of presenting to the children a "living" experiment, we established a control group based on recommendations by classroom teachers. The children recommended for the control group were not selected on the basis of equal intellectual ability but chosen because they were considered to be equal in mathematical ability to their ECP classmates. Therefore, the controls in this less extensive investigation were not necessarily the identical control subjects of the larger experimental study.

The experimental subjects received instruction in this new curriculum one hour a week for a period of four months. In spite of this short duration, some differences were noted in the final analysis of the data. Growth in mathematical efficiency and understanding was measured by two special forms of the Stanford Achievement Arithmetic Reasoning and Arithmetic Computation subtests. One form was given in February to all subjects while the other equivalent form was administered in June. We did not assume that an arithmetic achievement test would measure what was being taught in the mathematics enrichment program. No better

inventory of mathematical knowledge was available with equivalent forms at the elementary school level except The Stanford Achievement Test. Another test was considered which met most of the requirements but administration time was longer and, therefore, it proved impractical for the purposes of this investigation.

Table 7 demonstrates the statistical findings of the Mann-Whitney U test applied to the improvement scores obtained from the two achievement tests employed in this study. Differences between control and experimental groups were not found to be statistically significant in either of the areas measured: arithmetic reasoning and arithmetic computation.

TABLE 7

SUMMARY OF RESULTS WITH MANN-WHITNEY U TEST APPLIED TO
ACHIEVEMENT TEST IMPROVEMENT SCORES FOR EXPERIMENTAL AND CONTROL GROUPS

Test	Number of Subjects		U	Z	P
	Experimental	Control			
Arithmetic Reasoning	25	28	374	.06	.48
Arithmetic Computation	25	28	251.5	.24	.41

A differential enthusiasm and motivation was noted between grade levels for this variety of math enrichment. The fourth-graders showed more enthusiasm, in general, than the fifth- or sixth-graders. It probably represented, for the older group, an encroachment upon previously acquired information and skills. A comparison of improvement scores in both tests between the two ECP instructional groups revealed a highly significant difference between the younger group (composed of fourth- and fifth-graders) and the older group (composed mainly of fifth- and sixth-graders) in arithmetic computation in favor of the former. Moreover, the arithmetic reasoning improvement scores came very close to showing a significant degree of difference and, again, in the direction of the younger ECP pupils.

Table 8 summarizes the results of the statistical analysis on the data of the two ECP instructional groups. 8:30 and 9:45 refer to class opening times.

TABLE 8

SUMMARY OF RESULTS WITH MANN-WHITNEY U TEST APPLIED TO ACHIEVEMENT TEST IMPROVEMENT SCORES FOR THE TWO INSTRUCTIONAL GROUPS

Test	Number of Subjects		U	P
	8:30 Class	9:45 Class		
Arithmetic Reasoning	14	11	50	.10
Arithmetic Computation	14	11	31	.01 ⁺
⁺ refers to probability beyond .01 level				

In Table 9 are listed the results of an analysis of the improvement scores for experimental and control groups for the separate grade levels. The Mann-Whitney U test was employed, once again, to test for statistical significance of differences between the scores at each grade level.

TABLE 9

SUMMARY OF RESULTS WITH MANN-WHITNEY U TEST APPLIED TO ACHIEVEMENT TEST IMPROVEMENT SCORES FOR THE THREE GRADE LEVELS REPRESENTED

Test	Grade	Number of Subjects		U	P
		Experimental	Control		
Arithmetic Reasoning	4	4	8	16	N.S.
Arithmetic Computation	4	4	8	1	.004
Arithmetic Reasoning	5	12	12	59.5	N.S.
Arithmetic Computation	5	12	12	60.5	N.S.
Arithmetic Reasoning	6	9	8	34.0	N.S.
Arithmetic Computation	6	9	8	76.0	N.S.
N.S. refers to non-significant differences					

A highly significant difference was found between the experimental and control subjects in the fourth grade, favoring the former group. No significant differences were demonstrated between the other grade-level groups.

School Achievement of Experimental and Control Subjects

In the July 1960 Progress Report, there was an implication that the school achievement records of ECP pupils were better than the pupils in the control group. Fringe benefits of ECP in the form of higher school achievement were postulated.

A recent analysis of the achievement records of the third, fourth, and fifth grade experimental and control subjects over a period of three years lent some further support to the above postulation. 89 per cent of the experimental group and 81 per cent of the control group exhibited considerable positive differences from expected grade level achievement over a period of three years.

Considering the battery medians for each grade group separately, the range of difference scores, i.e., achievement expressed as differences from expected grade level, for the experimental group, third grade was 1.2 - 3.8; for the control group, third grade was 0.5 - 3.4; for the experimental group, fourth grade was 1.3 - 2.1; for the control group, fourth grade was -0.4 - 2.2; for the experimental group, fifth grade was 1.5 - 4.9; for the control group, fifth grade was 2.1 - 5.6. The range of difference scores for the 18 experimental subjects is 1.2 - 4.9; the range of difference scores for the 16 controls is -0.4 - 5.6. The achievement record seems to favor the third and fourth grade experimental groups, but the positive difference scores swing in favor of the control group at the fifth grade level.

Non-Test Data

Sometimes statistical findings do not communicate all the information that had been revealed by a study. In this experiment, three children can be described as examples of those who derived many benefits from the program and those who seemed to receive very little perceivable benefit.

Much Progress Shown

D. is a boy of 135 I.Q. whose parents are both professional people. When he entered the program three years ago, he was termed obnoxious and very aggressive. Since he has been in ECP, he has matured considerably in intellectual, social, and personality areas. His latest school achievement displayed a difference of 3.3 grades above his present grade level. In the test of responsibility to self and society, he was the highest "improver" in the experimental group. We believe that if this child, in the past three years, had remained in the regular classroom there might not be the same degree of improvement. This child with his negative characteristics entered ECP: He was understood, challenged, and taught how to get along with his intellectual peers as well as his age peers. Within the ECP group, he is considered by his teachers to be among the more creative children.

J. is an emotionally sensitive boy whose intelligence quotient just meets the admission criterion. His achievement varies in the positive direction 1.3 from his expected grade level. This is low in comparison to his peers in ECP. However, if benefits from the experimental program are to be determined by improvement scores obtained in the two objective tests, measuring evaluative ability and responsibility to self and society, then, we must assume that this child derived a great deal of benefit. He was among the top five scorers in the test of responsibility and he obtained a very high score in the Logical Reasoning subtests. In spite of this, his ECP teachers feel that J. would be happier in the regular classroom. In general, they do not feel he is contributing many fresh new ideas or original thought. It is postulated that, in this case, we have an emotionally insecure child who possesses good potential for creative work but is frightened by the competition he faces in the ECP classroom. J. might be the type of creative child with a high but not extremely high intelligence quotient who needs an enriched program but not one in which his intellectual ability appears to devalue his performance in his own eyes.

Limited Progress Displayed

L. is a ten-year-old girl with an I.Q. of 111 whose personality growth has been stifled by undetermined emotional problems. Her school achievement has been slightly above her grade level; improvement scores on the two objective tests have been average in relation to her ECP peers. On the demonstrated qualities of creativity and responsibility to self and society, ECP teachers have evaluated her much lower than most of her classmates. L. gets along fairly well with the other pupils but very often reverts to baby talk and becomes disorganized and confused about her assignments. Here we have a child whose inner tensions seem to override her other potentialities. It would be better for this child to participate in an "adjustment" class for highly intelligent pupils who have gotten side-tracked along the academic road. Until her emotional and motivational difficulties improve, there is little chance that an ECP will stimulate her to the use of all her innate abilities.

Thus, we have analyzed the program using various methodologies -- objective measurement, statistical analysis, ranking procedures, and qualitative observations.

CHAPTER IV

IMPLICATIONS OF THE FINDINGS

We have found, in the main, that the beneficial influence of an Enrichment Center Program is not identical for each child. Our findings would suggest that younger children of high mental capacity seem to derive greater benefit from our present enrichment curriculum than older children of equal ability. Perhaps our generally negative findings are due to the measuring instruments which were employed.

Certainly, the projective test had face validity but its weakness of discrimination at the upper levels did not assist in the discovery of significant differences between the older experimental and control subjects. In the measurement of evaluative ability, the ability to make generalizations and to draw conclusions from them, differences significantly greater than chance occurred and revealed some real benefit gained from the enrichment curriculum by the experimental group after one year. However, these differences did not show themselves after two and three years of participation in ECP. Perhaps these findings indicate an optimum length of time for participation in an ECP type of program.

There is a need for tests to be constructed which measure the significant associations and insights that a child has obtained through his ECP studies. Tests of creativity must of necessity contain free and open-end tasks which will leave room for the creative product. It is hoped that the pilot battery developed at the University of Minnesota will soon provide research workers in the field of the gifted with a reliable predictive instrument which will be able to measure aptitude for creativity in the young child.

In addition, we have learned from qualitative observation in the ECP classroom that some children of high mental capacity possess a great deal of potential for creative work and some appear to possess very little creative potential. After an analysis of evaluations by the teachers involved in the program, there

is indication that the children of the lower I.Q. levels, in general, are not able to produce the same quality of work in ECP as their more gifted classmates. This impression seems to disagree with Getzels and Jackson (1962) who have cited their findings as proof that an intelligence quotient of not more than 115 is necessary for high-quality creative work if the creative potential exists. Perhaps, two different types of enrichment are needed for the stimulation of creativity in the intellectually superior child and in the intellectually bright child. This might be a future area for exploration.

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APPENDICES

APPENDIX A

"THIS IS YOU" PROJECTIVE TEST

B

THIS IS YOU

Developed for Wantagh Schools by
Loron M. Simon & Beverly G. Rich
Drawings by Robert Kelly

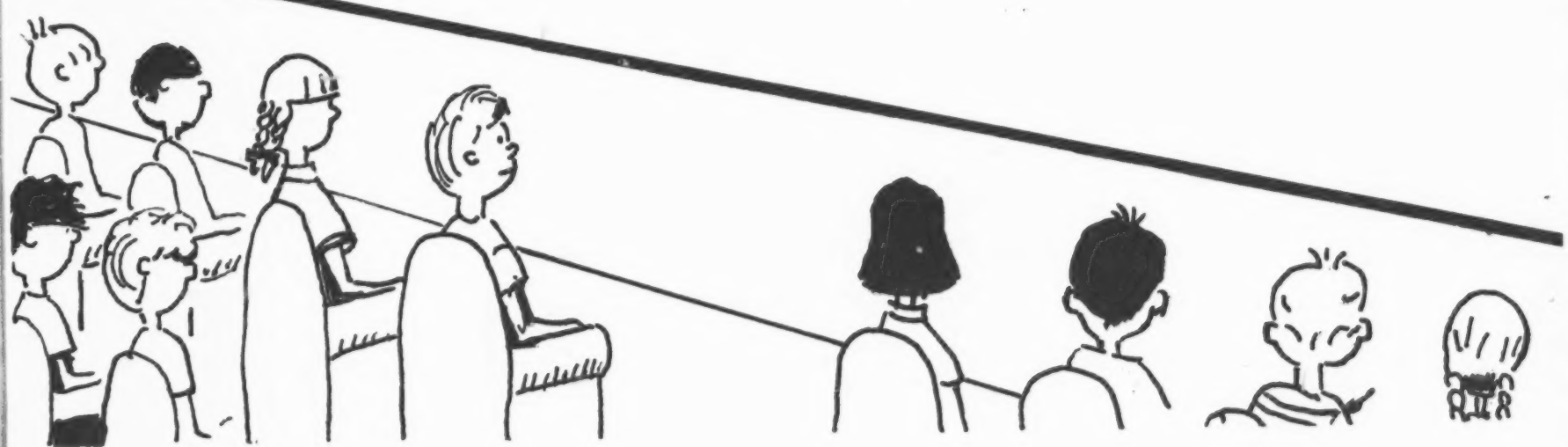
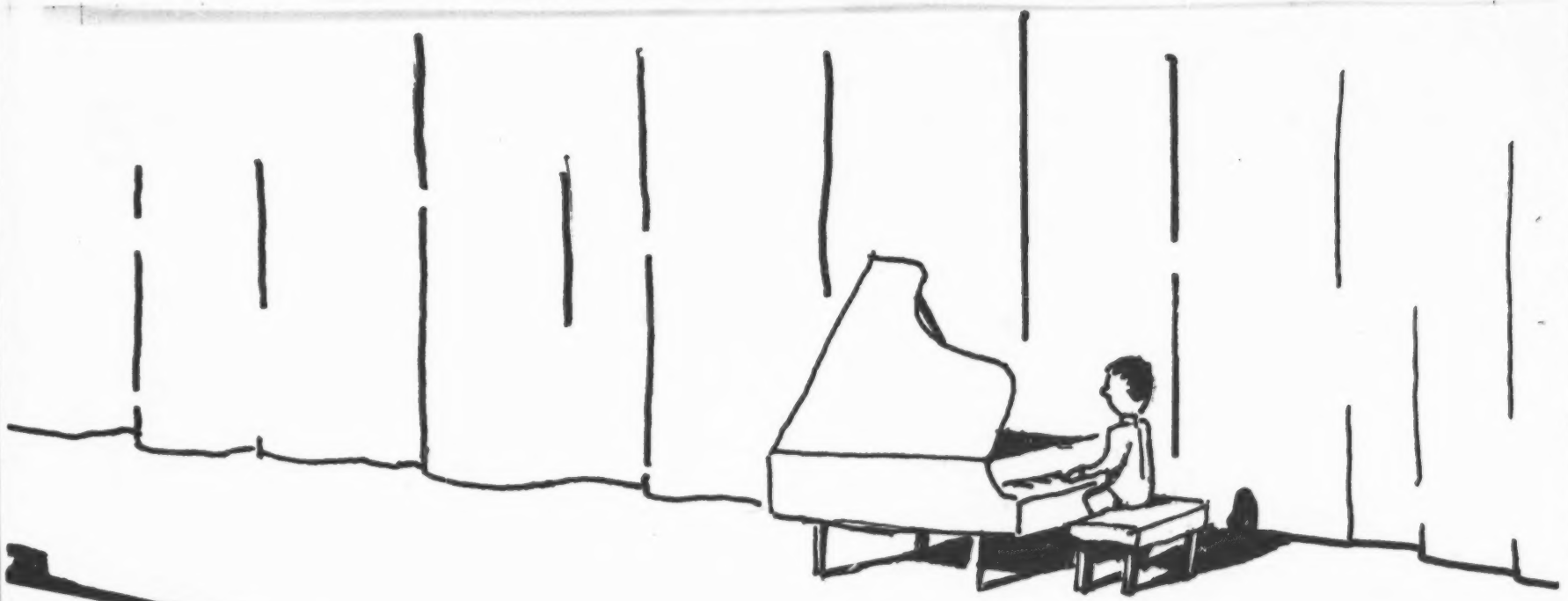
NAME _____

GRADE _____

SCHOOL _____

TEACHER _____

DATE _____

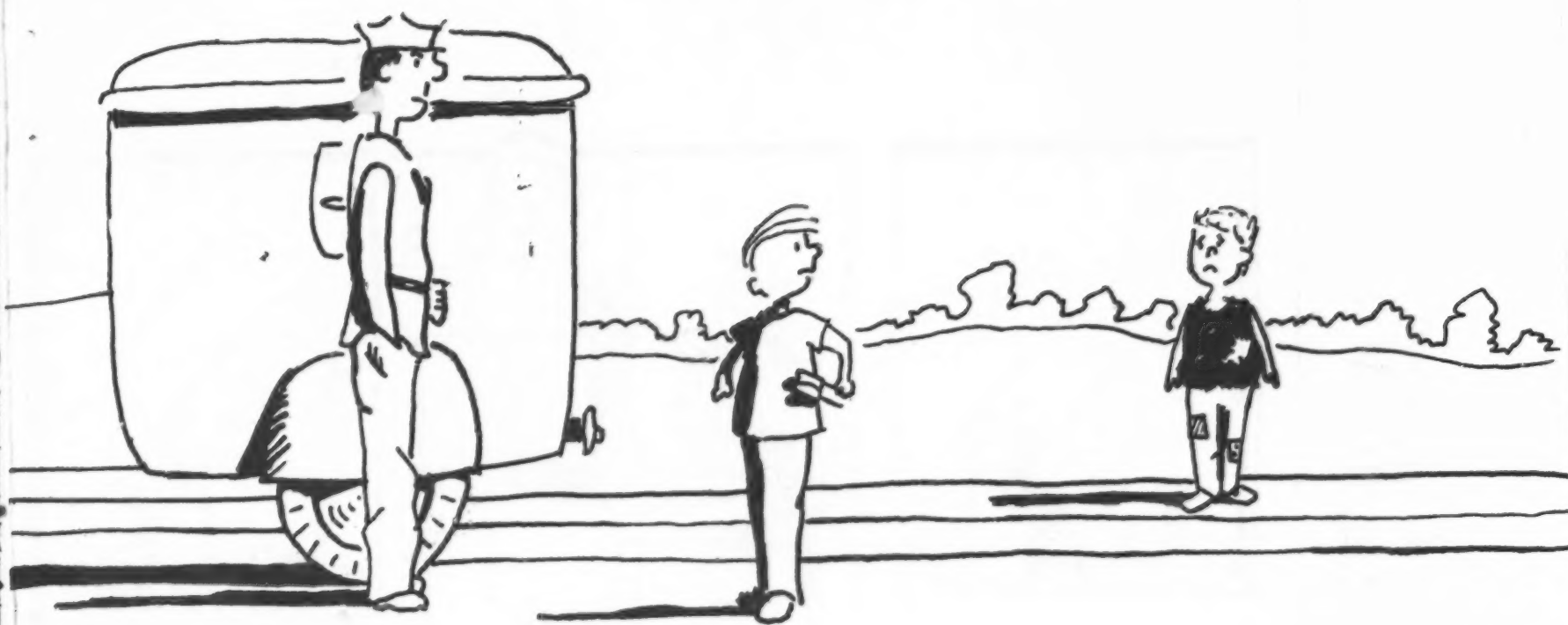


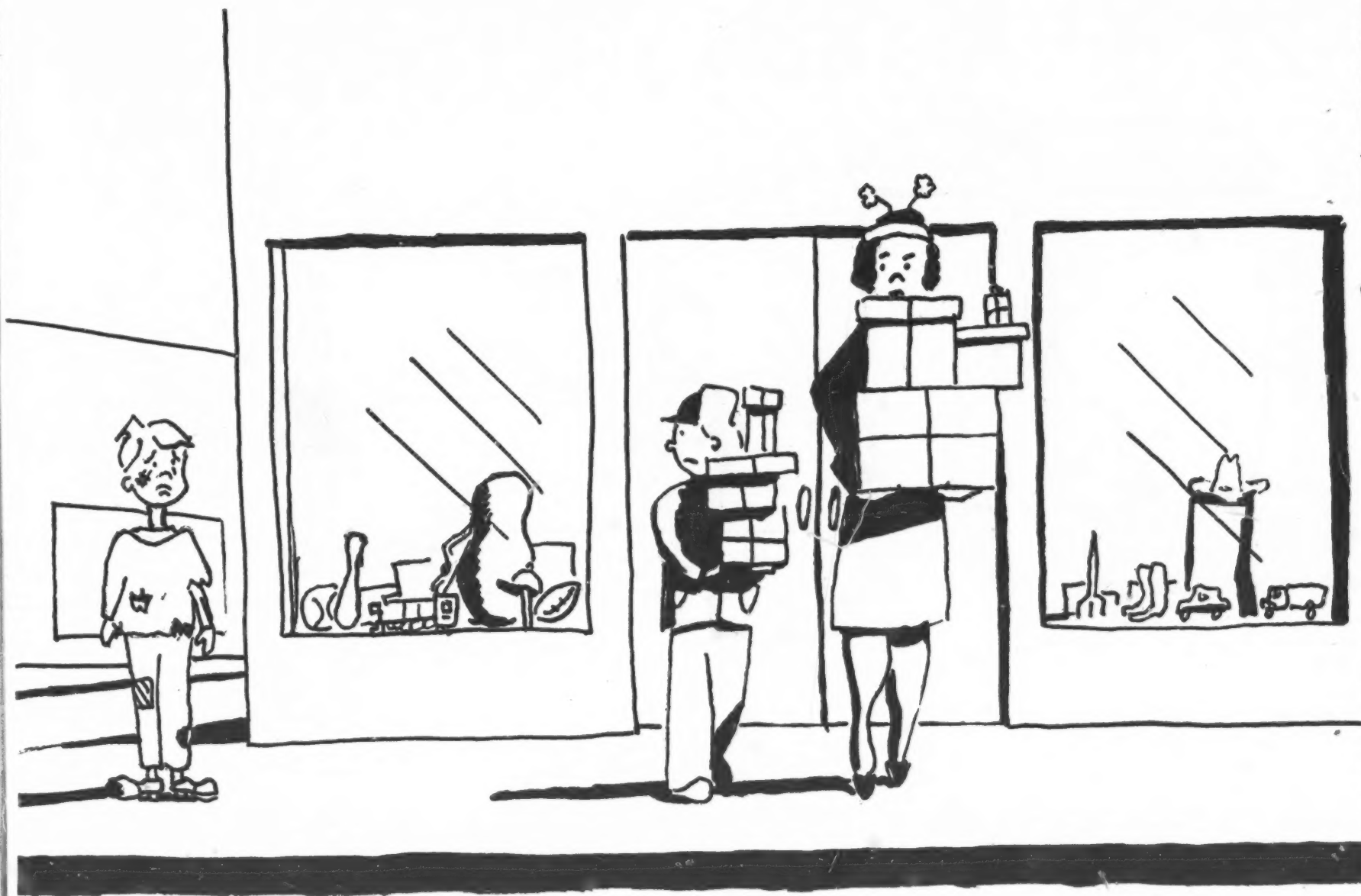












G

THIS IS YOU

Developed for Wantagh Schools by
Loron M. Simon & Beverly G. Rich
Drawings by Robert Kelly

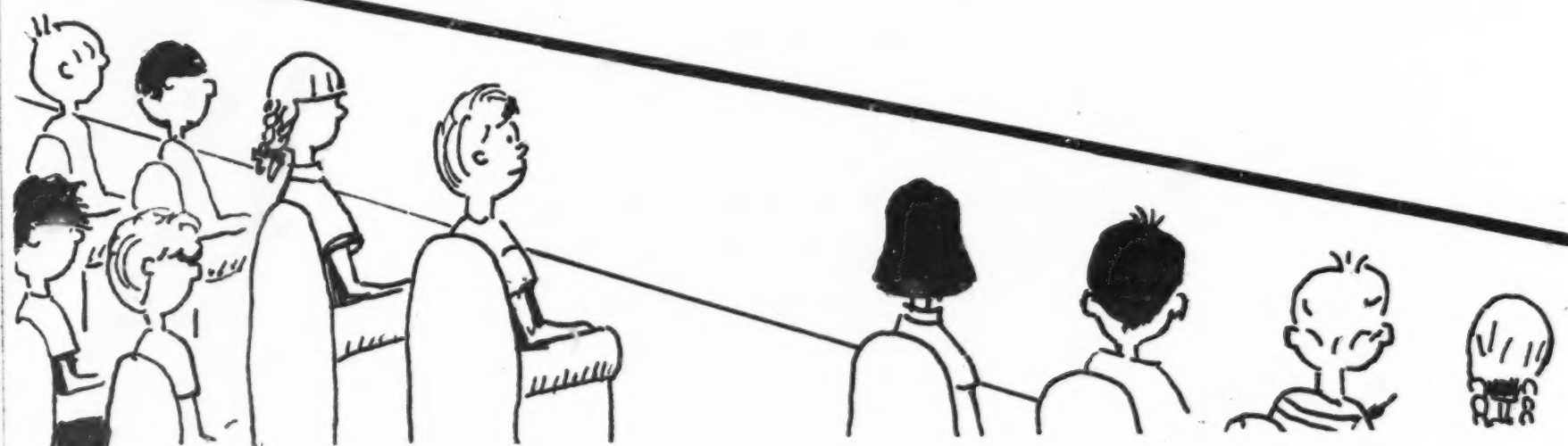
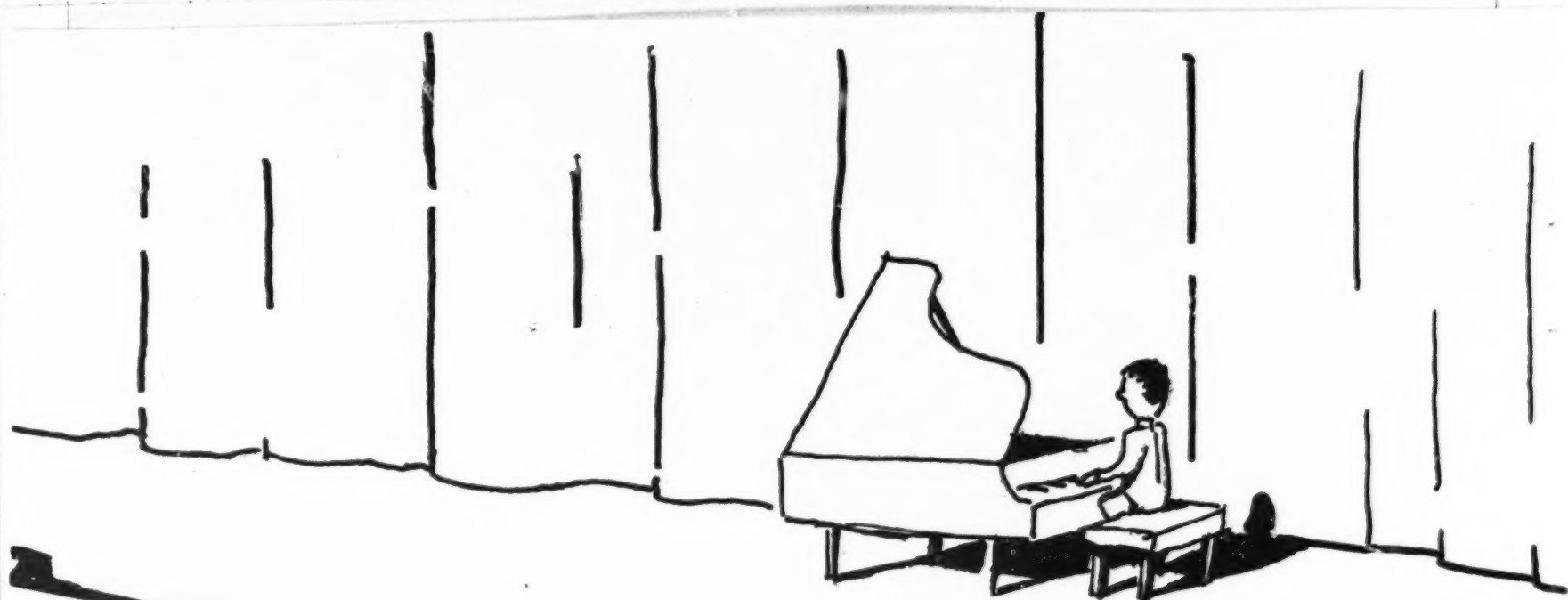
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GRADE _____

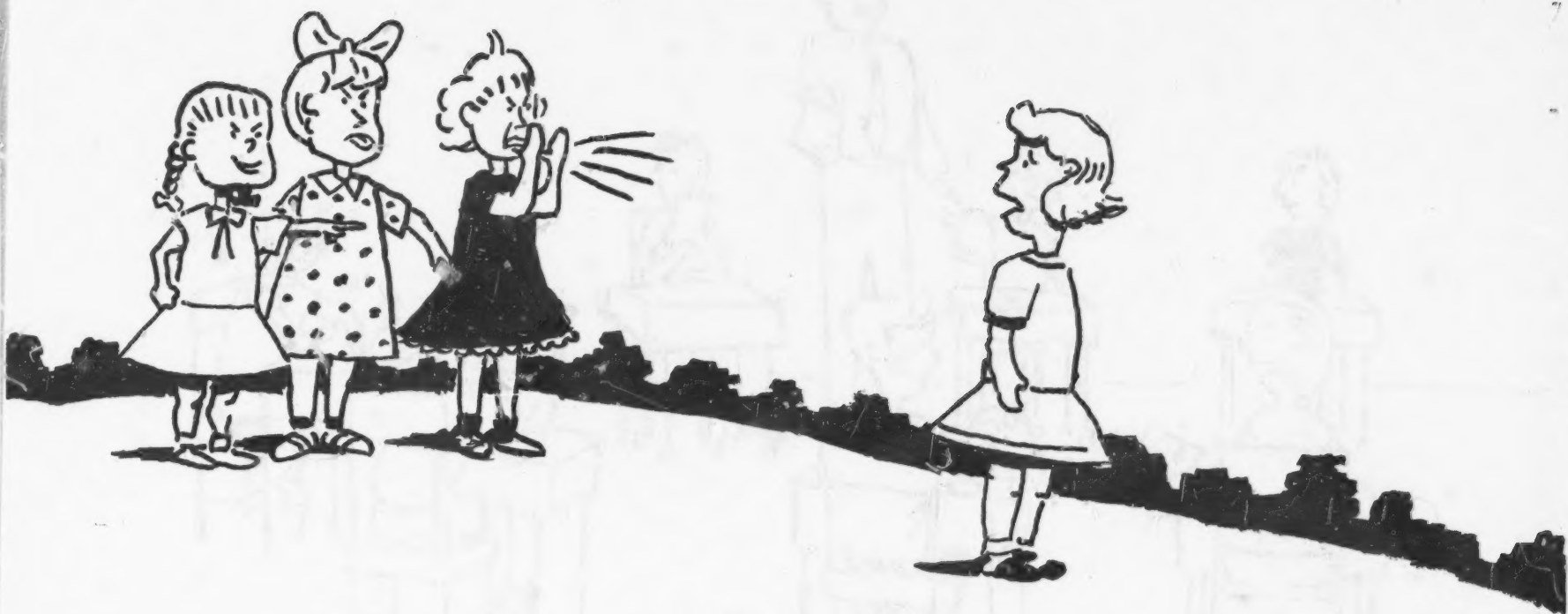
SCHOOL _____

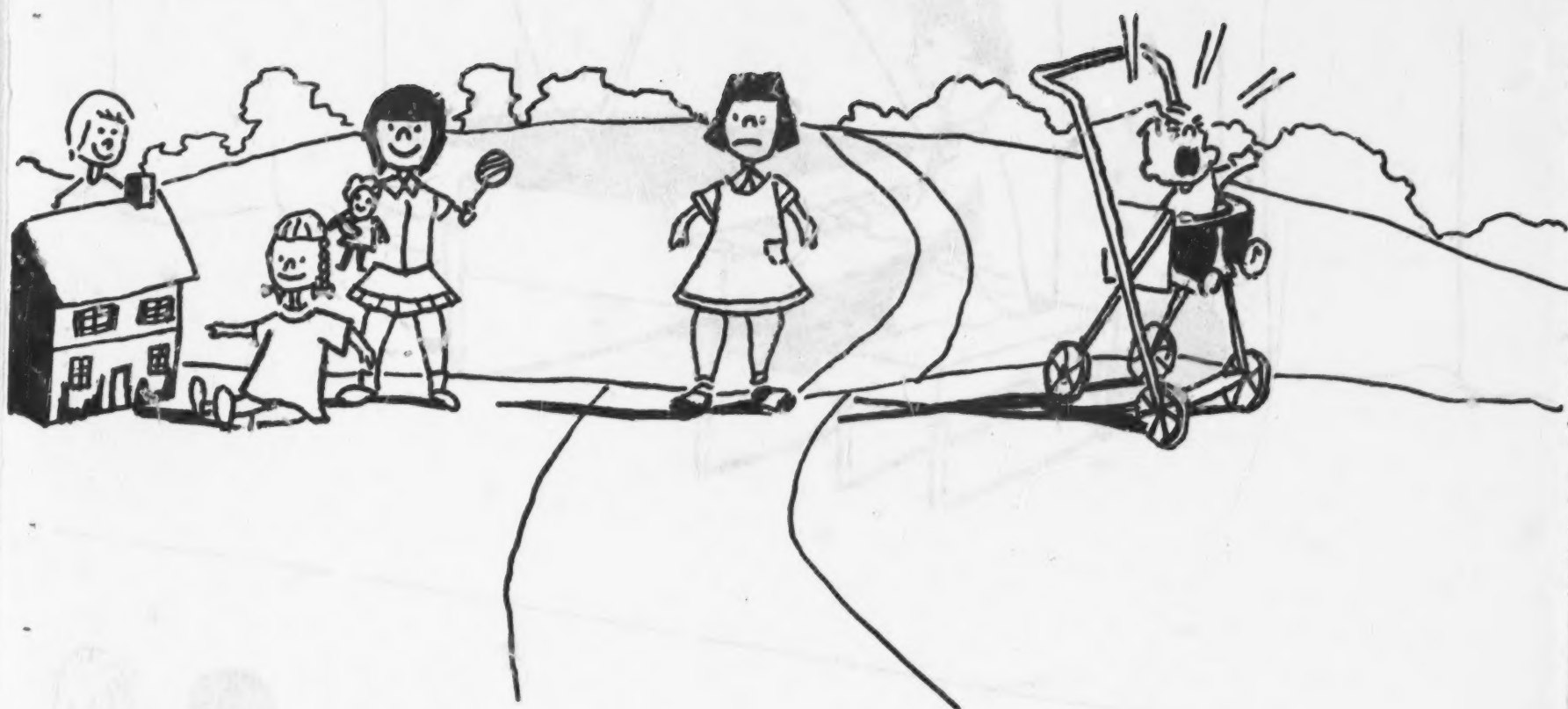
TEACHER _____

DATE _____

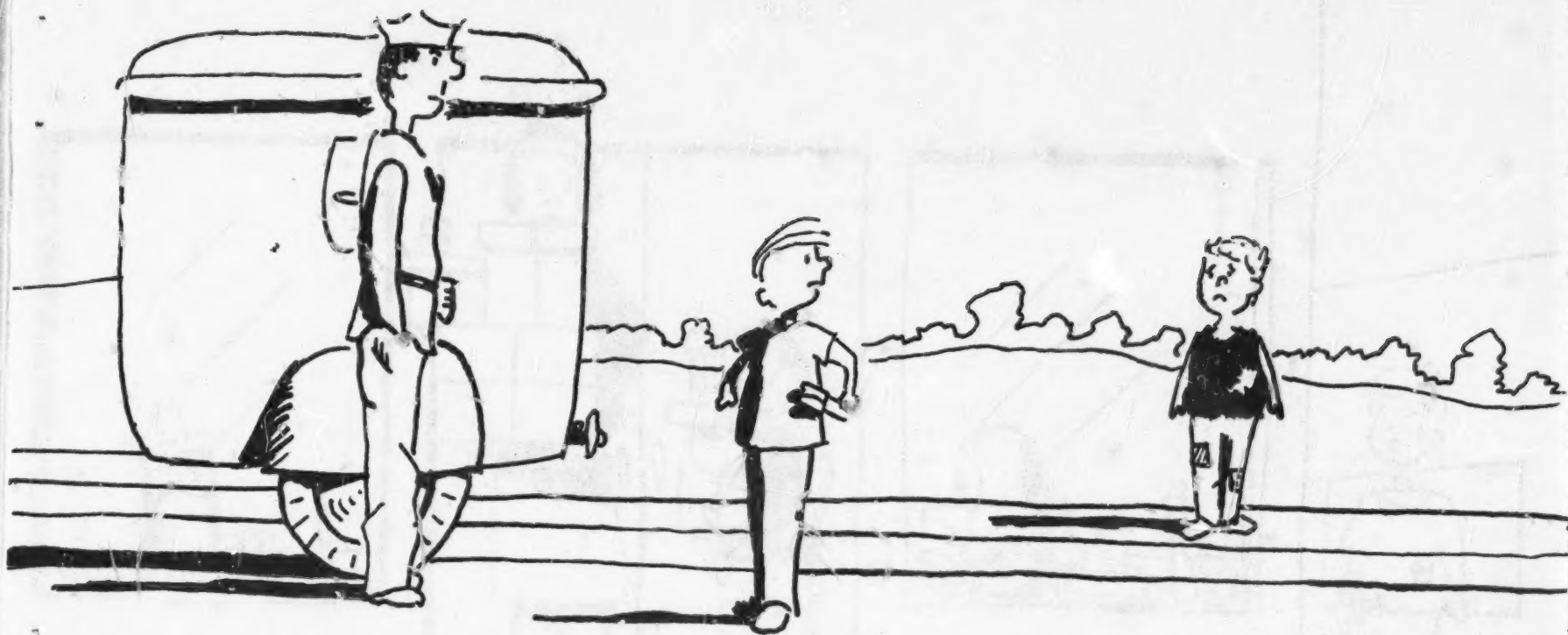


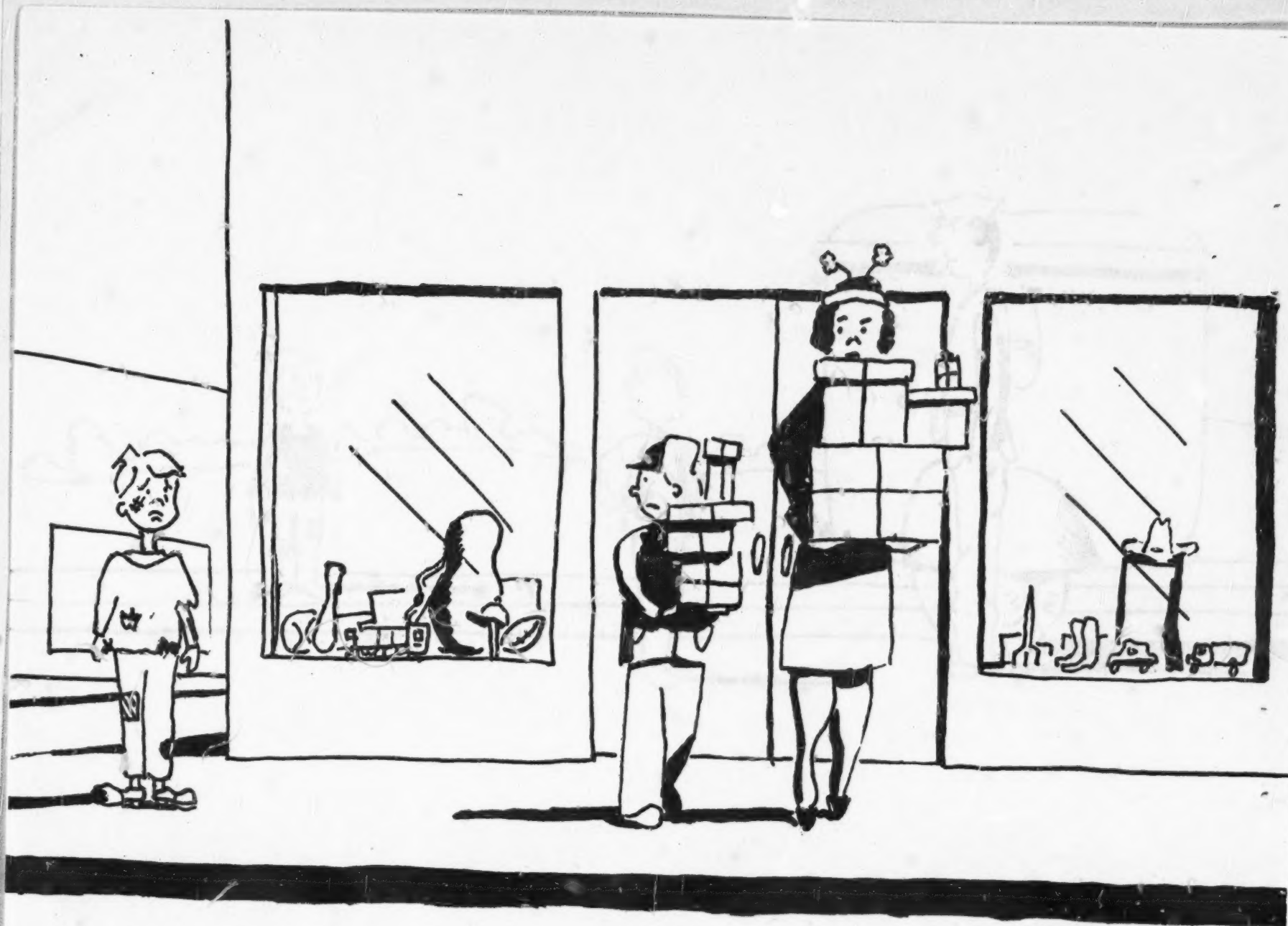












APPENDIX B

5-POINT RATING SCALE FOR PROJECTIVE TEST

Scoring Chart for IS YOU Test

Name	School	Grade	Teacher
I.			
A-1	Draws Attention to Self	Does Not Listen or Leaves	Sits Still But Not Really Interested
	1	2	3
A-2	Proud Do It Again	Happy Pleased	Sits & Watches Quietly and Feels Happy
	5	4	4
B-1	Highly Uncomplimentary or I'm Better Than You	Constructive Advice or Justifiable Criticism	Non-Committal or Indifferent(lucky)
	1	2	3
B-2	Blames Self Can or Will Do Better	Feels Sad or Sorry For Self or Better Luck Next Time	Statement of Fact or Indifference
	5	4	3
C-1	Criticism	So What?	Lucky or Other Recognition such as You're Better Than I
	1	2	3
C-2			Doesn't Want to Get 100
			1
D-1			Praise or Offer to Help
			5
D-2			Sour Grapes
			1
E-1			Congratulations or Genuine Praise
			5

III. Holds Self Responsible or Tries to Make Friends	Blames Self But Walks Away or Ignores				
	1	2	3	4	5
IV. Teases or Hurts Boy in Wheel Chair	1	2	3	4	5
V. Does Best To Please Audience	5	4	3	2	1
VI. Teases Boy	1	2	3	4	5
VII. Shares With Other Child	5	4	3	2	1

Blames Others But Ignores

No Blame Just Ignores

Retaliates

Takes Full Responsibility for Helping Boy in Wheel Chair

Partial Responsibility

Indifference

Refuses to Perform

Performs Against Will

Performs Indifferently

Performs Willingly

Feels Sympathetic But Does Not Assume Full Responsibility

Fails to Observe Problem

Aware of Problem But Ignores It

Aware of Problem But Ignores It

Fails to Observe Problem

Feels Sympathetic But Does Not Assume Full Responsibility

Share With Other Child

Teases Boy

APPENDIX C

IMPROVEMENT SCORES AND CORRESPONDING RANKS
ON PROJECTIVE TESTS

ONE YEAR IMPROVEMENT

<u>Experimental Group</u>		<u>Control Group</u>	
<u>Score</u>	<u>Rank</u>	<u>Score</u>	<u>Rank</u>
5	19.5	7	56.5
1	30	-6	2.5
-3	8	1	30
0.0	22.5	7.5	58
1	30	1	30
4	46.5	2	40
-1	16.5	1	30
3	43	1	30
-3	8	5	49.5
-3.5	5.5	2	40
-2	11.5	-3.5	5.5
3	43	-0.5	19
1.5	36.5	-1	16.5
0.5	25	0.0	22.5
7	56.5	1	30
-2.5	10	-1.5	14
-3	8	-0.5	19
-1.5	14	-6	2.5
5.5	53	-8	1
1.5	36.5	-1.5	14
1	30	0.0	22.5
0.0	22.5	5	49.5
5.5	53	4	46.5
2	40	5.5	53
3.5	45	-4	4
6.5	55	3	43
-2.0	11.5	1	30
5	49.5	1.5	36.5
1.5	36.5		
-0.5	19		
	915.5		795.5

TWO YEAR IMPROVEMENT

<u>Experimental Group</u>		<u>Control Group</u>	
<u>Score</u>	<u>Rank</u>	<u>Score</u>	<u>Rank</u>
3.0	14.0	1.5	9.0
7.5	30.5	7.5	30.5
3.5	17.0	5.5	25.5
7.5	30.5	-1.5	3.0
-0.5	4.5	8.5	33.5
-3.0	2.0	5.5	25.5
4.5	21.0	3.5	17.0
7.0	28.0	-7.0	1.0
-0.5	4.5	1.0	8.0
0.0	6.0	3.5	17.0
2.5	11.5	4.5	21.0
7.5	30.5	5.0	23.5
5.0	23.5	2.5	11.5
12.5	35.0	4.5	21.0
6.5	27.0	8.5	33.5
0.5	7.0	4.0	19.0
14.5	36.0	3.0	14.0
3.0	14.0		
2.0	10.0		
	352.5		313.5

THREE YEAR IMPROVEMENT

<u>Experimental Group</u>		<u>Control Group</u>	
<u>Score</u>	<u>Rank</u>	<u>Score</u>	<u>Rank</u>
2.0	13.0	0.0	7.0
8.0	29.5	3.5	19.0
2.0	13.0	4.0	22.0
8.0	29.5	5.5	25.0
-1.0	4.5	4.0	22.0
-2.0	3.0	2.5	15.0
2.0	13.0	-7.0	1.0
6.0	26.0	0.0	7.0
-5.0	2.0	4.5	24.0
-1.0	4.5	4.0	22.0
7.5	27.5	1.0	10.0
3.0	16.5	3.5	19.0
10.5	31.0	7.5	27.5
0.0	7.0	1.0	10.0
18.0	32.0	3.5	19.0
3.0	16.5		
1.0	10.0		
	278.5		249.5

APPENDIX D

IMPROVEMENT SCORES AND CORRESPONDING RANKS ON TESTS 7 AND 8
OF THE CALIFORNIA TEST OF MENTAL MATURITY

ONE YEAR IMPROVEMENT

Experimental Group		Control Group	
Score	Rank	Score	Rank
38	53	0	18
- 8	6.5	16	45.5
16	45.5	0	18
-16	4	-20	2.5
4	28.5	- 4	11
4	28.5	20	50.5
8	37	4	28.5
4	28.5	0	18
- 4	11	4	28.5
12	42.5	20	50.5
54	56	50	54.5
- 4	11	-25	1
50	54.5	16	45.5
37	52	4	28.5
8	37	4	28.5
4	28.5	0	18
12	42.5	0	18
16	45.5	- 4	11
- 8	6.5	8	37
4	28.5	-10	5
17	48	2	22.5
6	37	- 7	8
4	28.5	2	22.5
8	37	- 2	14
8	37	- 4	11
-10	41	18	49
-20	2.5	0	18
0	16	8	37
896.0		700.0	

TWO YEAR IMPROVEMENT

Experimental Group		Control Group	
Score	Rank	Score	Rank
62	30.0	54	28.5
8	16.5	0	4.5
54	28.5	8	16.5
41	27.0	4	10.0
16	24.0	0	4.5
- 3	1.5	8	16.5
1	7.0	10	20.5
18	25.0	2	8.0
4	10.0	5	12.0
6	13.0	12	22.0
4	10.0	10	20.5
- 3	1.5	22	26.0
0	4.5	0	4.5
13	23.0	8	16.5
8	16.5		
8	16.5		
254.5		210.5	

APPENDIX E

CURRICULUM FRAMEWORK FOR ENRICHMENT CENTER PROGRAM

REVISED JUNE 1962

Curriculum Framework
for
Enrichment Center Program

* * *

WANTAGH PUBLIC SCHOOLS
Wantagh, New York

* * *

William J. Krum, Jr.
Superintendent of Schools

Characteristics of high mental capacity children

First of all, these children are children. Secondly, they have high mental capacity. Intellectually capable children present the same variety of characteristics -- mental as well as social, emotional, and physical -- as any group of children. They, too, sometimes possess negative as well as positive characteristics. They represent various interests and strength areas.

Positive Characteristics

High mental ability children are likely to:

1. Be curious as indicated by the kind, depth, scope, and frequency of their questions;
2. Show interest in words and ideas as demonstrated by their use of dictionaries, encyclopedia, and other source books;
3. Have rich vocabularies marked by originality of thought and expression;
4. Enjoy reading, usually at a mature level;
5. Read rapidly and retain information;
6. Seek older companions among children and enjoy adults;
7. Have a good sense of humor and be cheerful;
8. Have a strong desire to excel;
9. Be quick to comprehend;
10. Follow directions easily;
11. Have ability to generalize, to see relationships, and to make logical associations;
12. Be interested in science, astronomy, and the nature of man and his universe;
13. Like to do research, to tabulate, to classify, to collect, and to keep records;
14. Show initiative and imagination;
15. Have good memories.

Negative Characteristics

1. Restless, inattentive, disturbing, or annoying to those around them, like many children who have unmet needs;
2. Poor in spelling, careless in handwriting, or inaccurate in arithmetic because they are impatient with details;
3. Lackadaisical in completing or handing in assignments, and indifferent towards classwork when disinterested;
4. Outspokenly critical both of themselves and of others, an attitude which often alienates adults as well as children.
5. Argumentative. (2)

Aims of Enrichment Center Program

The aims of the Enrichment Center Program are the same as those for all children in the Wantagh Public Schools. The experiences which the students have in the Enrichment Center Program will add breadth and depth to their educational program.

1. Development of leadership and followership qualities:

The Enrichment Center Program student must utilize his capacity for critical analysis in determining whom to follow, whose ideas are false and unacceptable and which courses of action are the most sound. He should, at times, display leadership qualities.

2. Development of individual interests and of social awareness through independent activities and through group experiences:

By allowing the child to work independently in the areas of his special interests, we can encourage him to use the initiative and originality with which he has been endowed. By working in a group situation, he can develop tolerance, patience, courtesy, respect for talents of others.

3. Development of ability to make generalizations and to draw conclusions:

By extending the sphere of activity from the Enrichment Center Program classroom into the total school program and community, we will give students first-hand experiences which will furnish an experiential background.

4. Development of unknown gifts:

Through broad experiences and the use of varied media, latent special interests and talents can be discovered and encouraged.

5. Development of known talents:

By using consultants, varied materials and a variety of experiences, we can develop special talents.

6. Growth in ability to think: to plan, execute, evaluate; to utilize critical analysis and original thinking; to practice the scientific method of attacking problems:

By providing opportunities to experiment; to discuss current events; to plan for group activities; these mental abilities will be developed.

7. Growth in awareness of responsibility to self:

The Enrichment Center Program student must be guided to use his abilities in analyzing and meeting his social and emotional problems and in achieving all-around development.

8. Growth in awareness of responsibility to society:

The Enrichment Center Program student must be guided to realize the value of the full development of his potentialities for his own happiness and the welfare of society, and to develop a wholesome attitude toward his own gifts and the abilities and interests of others.

Teaching-Learning Situation

For all children with superior intelligence, the teaching-learning situation should emphasize:

1. Experiences which arouse and maintain the questioning attitude, the inquisitive mind. Activities should provide opportunities for the child to experience the thrill of discovery and the satisfaction of curiosity through one's own efforts.
2. Experiences which develop understanding of the problem-solving process, of the tools and know-how of research, and of the resources available in problem solving. Activities should guide students to the effective use of resources at their level for the solution of problems.
3. Experiences which stimulate the motivation and ability to think critically, reflectively, and objectively. Activities should assist students in judging the quality of their thinking and in internalizing the importance of exercising critical judgments.
4. Experiences which foster independence of work and study. Activities should encourage students to follow their interests and to focus on tasks until self-set goals are realized.
5. Experiences which result in early mastery of foundation skills necessary for advanced, specialized endeavors. Activities should provide for development of skills in communication, observation, computation, cooperation and similar specifics which are precursors to any original creative efforts.
6. Experiences which nurture the desire for creative expression. Activities should encourage students to formulate creative ideas, to explore areas for original expression.
7. Experiences which build skills of conceptualizing, generalizing, and synthesizing meanings. Activities should extend the building of insights and meanings through conscious attention to the processes involved.
8. Experiences which build the necessary competencies in an area of talent. Activities will not necessarily evoke the full development of a talent, but should enable the student to practice the skills, to explore the nature of a specialized area, and to develop some feeling of his place and possibilities therein.
9. Experiences which help him find his place in the perspective of his environment, present and future. (4)

Enrichment Aims

The objectives of enrichment are to:

1. Challenge the full use of abilities.

Progress along any line depends upon the recognition of obstacles and the determination to overcome them. Luckily the drive to advance in the face of difficulties is apparently innate in human beings. The curiosity and range of interests typical of the bright child make it easy to engage his efforts, and his attention span helps him persist in the face of difficulty. He eagerly attacks puzzles, word games, and "originals" in geometry. He welcomes every "Why?" He enjoys using what he knows, and works hard to learn what he sees may be useful. He takes great satisfaction in success for itself and also when it represents a victory either over a temporary failure of his own or over a competitor. In short, challenge stimulates learning.

2. Broaden the base of knowledge.

A broad base of knowledge within one field is a sound foundation for memory of facts, because each fact adds associations. A breadth of knowledge covering many fields helps the bright pupil explore his aptitudes and choose the field which interests him most. He acquires a breadth of vision which keeps him from becoming the kind of specialist who knows more and more about less and less, "who can't see the wood for the trees."

3. Deepen understanding.

The more thorough a student's knowledge of why a thing is so -- of why a word is spelled as it is, of why closing a switch starts a current -- the more quickly he learns not only that fact but also related facts. And understanding makes for the quick and accurate application of knowledge in new situations. The bright student, because of his ability to think abstractly and to make generalizations, is quick to profit from understanding. The boy who enriched his work in language by making a comparative dictionary was cementing his knowledge of the contributing languages and laying the groundwork for further language study.

4. Increase the level of skills.

Enrichment should foster many more skills than those included in the phrase "skill subjects," meaning arithmetic and the language arts. It should give the bright pupil the chance to apply practically and at increasingly high levels the knowledge he gains from all branches of the curriculum. And it should help him cultivate skill in human relations.

5. Develop a love of learning.

6. Inculcate desirable methods of learning, thinking, and sharing.

The bright pupil who is not encouraged to learn more than the curriculum requires is missing both extra knowledge that he might acquire and helpful exercise in learning, thinking, and sharing. Moreover, because he does not have to work hard or think critically, he has no incentive to improve his method of learning or the logic of his thinking. And, because he is not acquiring knowledge and skills which he might put to the service of slower classmates, he has less to share even if the desire to share is present.

7. Encourage initiative.

Initiative, like any other character trait, thrives on exercise and is blighted by disuse. The initiative typical of the bright child is encouraged when he is given the opportunity to choose ways in which to enrich his program.

8. Give play to creativity.

One of the tragic shortcomings in the development of bright boys and girls is the extent to which they lose the creativity which is typical of them as young children. Part of the reason is the pressure for conformity exerted by their parents, teachers, and most of all, their contemporaries. Part of the loss is due to their being forced to learn techniques of expression in a setting that inhibits expression. Paradoxically, these children are also increasingly inhibited because they do not know the techniques which they require in order to express what they feel. In writing, in art, in music, in mechanical invention, the child, or individual of any age, should create rather than imitate. He must experience the pleasure of producing.

9. Provide bases in various fields for productive leisure time activities.

(3)

The Teacher of the Gifted

As with all educational programs, the teacher is an important key to the quality of learning. It is the teacher who provides the conditions for effective learning in an atmosphere in which interests and abilities are developed and students motivated to high achievement. He provides effective teaching not only by what he does but, more important, by what he is. If the teacher is constantly increasing his own self-understanding and expanding his horizons of mastery and appreciation, these make a difference in the dimensions of student learnings. His insights of the teaching-learning process, the resources available, and the available instructional methods coupled with a sympathetic understanding of the unique needs of the child of superior intelligence can open up the students' desires for wanting to know and do. (5)

A basic understanding between teacher and pupils in the Enrichment Center Program is that no one knows the answers to all questions. Members of the group work with the teacher to discover answers.

General Suggestions for

Activities
Trips
Vocabulary
Materials
Resource People

in

ART OF LIVING

Language Arts
Creative Arts
Art of Inquiry

LANGUAGE ARTS

Activities

I READING

A. Creative expression (active participation)

1. Reading to younger children
2. Research
3. Anagrams
4. Vocabulary development (Latin keys)
5. Poetry - written

B. Appreciation (Passive)

1. Contemporary literature and great stories or classics
2. Realistic and fanciful literature
3. Fictional and informational literature
4. Periodicals and books
5. Popular materials and distinctively literary reading matter
6. Prose and poetry
7. History of English language
8. Etymology
9. Individual projects in Hebrew, Spanish, French
10. Individual study of Braille, alphabet, imaginative language, newspaper analysis, meter in poetry

C. Extension and application of skills

1. Research techniques
2. Grammar
3. Use of dictionaries, encyclopedias, library
4. How to study
5. Bibliography

II LISTENING

A. Creative expression

1. Listening to nature's sounds
2. Listening to industrial sounds
3. Listening to human sounds
4. Listening during discussions, panels, reports, lectures, directions, choral speaking, storytelling, etc.
5. Listening to TV and radio
6. Records

B. Appreciation

1. Attendance at programs requiring listening

C. Extension and application of skills

1. Purposeful listening
 - a. Listening for an answer to a definite question
 - b. Listening to a question, with the intention to answer
 - c. Listening to form an opinion on a controversial question
 - d. Listening for news
 - e. Listening to an argument in order to answer it
 - f. Listening to directions which one expects to follow
 - g. Listening for unspecified information on a topic in which one is interested
 - h. Listening for note taking (shorthand transcription)
2. Accurate listening
 - a. Structuralizing the presentation
 - b. Striving to grasp the central ideas in the presentation
3. Critical listening
4. Responsive and appreciative listening
 - a. "Listen unto others as you would have them listen to you."

III ORAL EXPRESSION

A. Creative expression (Active)

1. Conversation
2. Discussion
3. Panel discussions
4. Debates
5. Storytelling
6. Reporting
7. Interviewing
8. Introductions
9. Parliamentary procedure
10. Interpretative oral reading
11. Choric speech
12. Announcements, directions, etc.
13. Broadcasting
14. Recording
15. Poetry

B. Appreciation (Passive)

C. Extension and application of skills

1. Vocabulary development
2. Techniques of oral speech
3. Increase of poise and assurance
4. Development of work sensitiveness
5. Improvement of voice qualities
6. Development of effective speech

IV WRITTEN EXPRESSION

A. Creative expression

1. Opportunities for creative writing
2. Opportunities for writing poetry
3. Opportunities for writing plays
4. Writing of book
5. Writing of newspaper
6. Crossword puzzles

B. Appreciation

1. Reading of prose and poetry of famous writers and poets
2. Reading of biographies of authors

C. Extension and application of skills

1. Correct usage
2. Selection and organization of material
3. Sentence structure

Miscellaneous

Study of how newspaper, magazine, radio, and television ads try to influence people through use of pictures, cartoons, description, sensory impressions.

Story telling to younger children.

New words to our language: nylon, deep freeze, cellophane, smog, motel.

Trace origin of figurative language: "Quick as a wink" -- meaning.

Choral reading.

Puppets.

Creative writing.

Write: mysteries, tall stories, adventure, poetry, science fiction, travel stories; new beginnings, new endings for familiar stories.

Newspaper reading.

Book cafeteria.

Discussions. See p. 177 EDUCATING GIFTED CHILDREN

Trips

1. Attendance at theatre performances
2. Attendance at debates, panel discussions, etc.
3. Newspaper plant
4. Book store

Vocabulary

Whenever possible, the vocabulary used by the practitioner of the discipline should be employed.

Materials

1. Typewriter
2. Duplicating machine
3. Radio-phonograph
4. Tape recorder
5. Thesaurus
6. UNABRIDGED DICTIONARY
7. Foreign language dictionaries
8. ROBERT'S RULES OF ORDER REVISED
9. Encyclopedias
10. Puppets
11. Anthologies of literature
12. Books

Resource People

Parents of Enrichment Center Program pupils
High School teachers
College teachers
Special area personnel
Community

CREATIVE ARTS

I ART

Experiences

A. Creative expression (Active)

1. Drawing
2. Painting: poster, water, oil
3. Clay modeling
4. Woodcraft
5. Weaving
6. Leathercraft
7. Block-printing
8. Metal work
9. Carving
10. Puppetcraft
11. Paper craft
12. Textile
13. Mosaics
14. Mobiles

B. Appreciation (Passive)

1. Visits to museums (Metropolitan Museum Art, Modern Art)
2. Visits to art galleries
3. Study of masters: paintings, biographies (Renoir, Van Gogh)
4. Study of sculpture (Thinker)

C. Extension and application of skills

II MUSIC

A. Creative expression (group and individual)

1. Vocal
2. Instruments (for Sleeping Beauty-Suitephony)
3. Development of talent
4. Creative work

B. Appreciation

1. Musical composition or form
 - a. Symphonic (Children's Symphony)
2. Listening
 - a. Recordings (Nutcracker Suite-Grand Canyon Suite)
 - b. Concerts (Carnegie Hall-Wheeler Beckett)
3. Analysis
 - a. Popular
 - b. Classical
4. Musical instruments
5. Biographies of composers
6. Reading

C. Extension and application of skills

III DRAMATICS

A. Creative expression

1. Dramatic play (playing poetry, Sleeping Beauty)
2. Writing, producing plays (Adventure on Fairy Queen's Birthday, Grand Canyon Suite) (Firebird Suite)
3. Radio and TV
4. Pantomime, shadow plays, flannel boards
5. Puppets and marionettes

B. Appreciation

1. Attendance at various types of plays
2. Reading of plays

C. Extension and application of skills

Trips

I ART

- A. Metropolitan Museum of Art
- B. Modern Museum of Art

II MUSIC

- A. Carnegie Hall

III DRAMATICS

- A. Shakespeare

Materials

A. ART

1. Paints
 - a. water colors, tempera, poster, oils
2. Charcoal
3. Clay
 - a. glazes, plaster, clay tools, clay, kiln
4. Silk screen materials and inks
5. Colored pencils, crayons, poster inks
6. Linoleum blocks and tools
7. Pipe cleaners
8. Crepe paper and tissue
9. String, wire, lead weights
10. Tools for wood, leather, textiles
11. Prints
12. Textiles
13. Models
14. Statuettes
15. Mobiles

B. MUSIC

1. Phonograph
2. Piano
3. Autoharp
4. Rhythm instruments
5. Recorder
6. Records
7. Song books for community singing
8. Picture charts of instruments and orchestras

ART OF INQUIRY

I SCIENCE

Activities

A. Scientific experiences

1. Individual projects and exploration (heredity, ophthalmology, frog, dying)
2. Demonstrations (air, frog)
3. Microscope study (Through the Microscope Fabrics)
4. Astronomy
5. Special Planetarium Show
6. Operation Space
7. IGY Activities
8. Terrariums
9. Mobiles
10. Scientific method
11. Scientist's Lab

B. Appreciation

1. Biographies of scientists
2. Application of science to industry, medicine, etc.

C. Extension and application of skills

1. Use of scientific approach

Miscellaneous

Collection of toys demonstrating scientific principles.

"Science says" poster ("Science says salt water has greater lifting power than fresh water.")

Idea factory.

"Hall of Fame" notebook for scientists.

Read classical myths which reflect ideas of ancient people about science.

II MATHEMATICS

A. Creative expression

1. Creating our own number puzzles
2. Working puzzles and tricks
3. Geometric forms in nature
4. Solar system to scale
5. Bisect lines and angles
6. Compasses and rulers for designs
7. Discuss budget -- keep budgets
8. Value of music notes -- graph

B. Appreciation

1. History of math
2. Application of math to business and industry

C. Extension and application of skills

1. Use of many and varied math instruments

Miscellaneous

Workout in mental gym.

III CITIZENSHIP EDUCATION

A. Creative expression

1. Panels, forums, discussions, etc. (analyze each other and self)
2. Trials - mock
3. Individual projects
4. Current events
5. Interpretation of maps, globes, charts, graphs, tables
6. Explore community, county, state, nation
7. Family trees
8. International Supper
9. National Convention

B. Appreciation

1. Read biographies, historical fiction, travel books
2. America's moral and spiritual heritage
3. Study of ancestors
4. Attend various church services

C. Extension and application of skills

Miscellaneous

Study flags, shields - origin, purpose, design, color, meaning
News map - colored pins
Ancestry map
Study of descriptive names of roads, etc.
Letters to foreign students
Reports about historical TV programs
Skits
Readings for holidays
Models
Map of town, etc., see p. 244 MORE THAN SOCIAL STUDIES
Ancestors for the world - family tree see pp. 241-243 MORE THAN SOCIAL ST.
Electric quiz
Dinner with each course from different country
Newspaper activities p. 373 CHILDREN AND THE LANGUAGE ARTS

IV HEALTH AND PHYSICAL EDUCATION

- A. Creative expression
 - 1. Baseball game
 - 2. Rhythms
 - 3. Modern Dance
- B. Appreciation
- C. Extension and application of skills

Trips

I SCIENCE

- A. Weather station
- B. Airports
- C. Industrial plants
- D. Plant nurseries
- E. Greenhouses
- F. Printing plants
- G. Fish hatcheries
- H. Zoos
- I. Museums
- J. High School Labs

II MATH

- A. Engineer's office
- B. County treasurer's office
- C. Local architect
- D. Civil engineer surveying
- E. Stock Exchange
- F. Coast Guard - radio direction finder station
- G. Kings Point
- H. Sands Point

III CITIZENSHIP EDUCATION

- A. Public utility buildings
- B. Government buildings
- C. Libraries
- D. Historical monuments and sites
- E. Museums
- F. Public service agencies
- G. Newspaper plants
- H. Expositions and exhibits

Vocabulary

Materials

A. SCIENCE

1. Magnets
2. Soldering iron
3. Bunsen burner
4. Scales
5. Electrical kit: batteries, buzzers, wire, insulators, coils, transformers, headphones, switches
6. Microscope
7. Specimen mounts and slides
8. Test tubes, glassware
9. Basic chemicals for biology and chemistry study
10. Pulleys and weights
11. Aquarium
12. Sand table
13. Screening for cages
14. Photographic equipment
15. Simple steam engine
16. Thermometer
17. Barometer
18. Celestial globe
19. Astronomical chart
20. Lenses and prisms
21. Tuning-fork
22. Tubing: glass and rubber
23. Field guides and science manuals

B. MATHEMATICS

1. Abacus
2. Compass
3. Protractor
4. Solid forms: sphere, cube, prism, etc.
5. Measuring: linear, volume, etc.
6. Simple adding machine
7. Graph paper
8. Games
9. Scales
10. Rulers

C. CITIZENSHIP EDUCATION

1. Maps
2. Globes
3. Magazines
4. Newspapers

D. HEALTH AND PHYSICAL EDUCATION

Specific

Aims
Themes
Disciplines
Concepts
Experiences
Evaluation

Jerome S. Bruner in The Process of Education has projected provocative thoughts regarding the need to expose children at an early age to the structure of the various disciplines and to the method of inquiry of each academic area.

"Grasping the structure of a subject is understanding it in a way that permits many other things to be related to it meaningfully. To learn structure, in short, is to learn how things are related." (1)

The method of inquiry may be considered to be the steps in the process of discovering the learnings in the discipline.

It is intended that the structure of a discipline and the method of inquiry be emphasized on each grade level.

Kindergarten, Grades 1 and 2

AIMS:

Development of unknown gifts and development of known talents.

THEMES:

We explore ourselves and our environment.

DISCIPLINES:

Creative Arts -- Art, Music, Drama, Dance.

CONCEPTS:

Each of us is an individual.
We see, hear, smell, feel, and taste.
We think.
Experiences differ.

LANGUAGE ARTS:

Classics
Creative writing
Listening for various purposes

CREATIVE ARTS:

Structure: It is felt that the creative arts are the least structured of the disciplines.

Method of inquiry: Steps in the creative process.

1. A stage of preparation in which the basic impressions and ideas for the painting, story, song are gathered.
2. A stage of reflection -- of mulling over the initial idea.
3. An inspiration as to how the idea may be developed into a poem or a story.
4. The stage of producing the first draft.
5. A stage involving judgment, evaluation, appraisal, or verification.

These steps should be considered flexible.

Explore varied media of expression.

Create
Plan
Produce
Evaluate

Visit art galleries
Attend concerts
Attend dramatic productions

Kindergarten, Grades 1 and 2

MATHEMATICS:

Professor Inhelder of Geneva suggests that "it might be interesting to devote the first two years of school to a series of exercises in manipulating, classifying, and ordering objects in ways that highlight basic operations of logical addition, multiplication, inclusion, serial ordering, and the like. For surely these logical operations are the basis of more specific operations and concepts of all mathematics and science. (1)

Cuisenaire rods

Mental gymnastics

Dr. Patrick Suppes - Work in Geometry

SCIENCE:

Plants and animals

Record data, etc.

SOCIAL STUDIES:

News reports

Holidays

Grade 3

AIMS:

Development of individual interests and growth of responsibility to self.

THEMES:

We know ourselves.

DISCIPLINES:

Language Arts -- Listening, Speaking, Reading, Writing.

CONCEPTS:

We have certain gifts which we can share with others.
We have ethical, moral, spiritual responsibilities.
We have the privilege of being in the Enrichment Center Program; there are responsibilities involved, responsibility to self and to society.

LANGUAGE ARTS: (With an emphasis on the discipline in Grade 3)

Structure: Bruner cites an example:

The often unconscious nature of learning structures is perhaps best illustrated in learning one's native language. Having grasped the subtle structure of a sentence, the child very rapidly learns to generate many other sentences based on this model though different in content from the original sentence learned. And having mastered the rules for transforming sentences without altering their meaning--"The dog bit the man" and "The man was bitten by the dog"--the child is able to vary his sentences much more widely. Yet, while young children are able to use the structural rules of English, they are certainly not able to say what the rules are.

Method of Inquiry:

Present best examples
Employ intuitive thinking

CREATIVE ARTS:

Explore varied media of expression
Create
Plan
Produce
Evaluate
Visit art galleries
Attend concerts
Attend dramatic productions

Grade 3

MATHEMATICS:

Professor Inhelder of Geneva suggests that "it might be interesting to devote the first two years of school to a series of exercises in manipulating, classifying, and ordering objects in ways that highlight basic operations of logical addition, multiplication, inclusion, serial ordering, and the like. For surely these logical operations are the basis of more specific operations and concepts of all mathematics and science. (1)

Cuisenaire rods
Mental gymnastics

SCIENCE:

Plants and animals
Record data, etc.

SOCIAL STUDIES:

News reports
Holidays

Grade 4

AIMS:

Development of leadership and followership qualities.

THEMES:

We explore the foundations of our democracy.

DISCIPLINES:

Mathematics.

CONCEPTS:

Freedom is a right of man which he must protect and nurture.
Our forefathers left a legacy of principles of the democratic
way of life.

LANGUAGE ARTS:

Creative writing
Great Books
Parliamentary procedure
Rules of sportsmanship
Debates, panel discussions

CREATIVE ARTS:

Explore varied media of expression
Create
Plan
Produce
Evaluate
Visit art galleries
Attend concerts
Attend dramatic productions

Grade 4

MATHEMATICS: (As a discipline in Grade 4)

Structure: Bruner states:

Much more briefly, to take an example from mathematics, algebra is a way of arranging knowns and unknowns in equations so that the unknowns are made knowable. The three fundamentals involved in working with these equations are commutation, distribution, and association. Once a student grasps the ideas embodied by these three fundamentals, he is in a position to recognize wherein "new" equations to be solved are not new at all, but variants on a familiar theme. Whether the student knows the formal names of these operations is less important for transfer than whether he is able to use them. (1)

Method of inquiry:

Present logic of mathematics
Intuitive thinking

School Mathematics Study Group

SCIENCE:

Plant and/or animal biology
Study and procedure of microscope

SOCIAL STUDIES:

Our country
Rise of newspaper
Our country's newspapers (small town - regional)

Grade 5

AIMS:

Growth in awareness of responsibility to society and development of ability to make generalizations and to draw conclusions.

THEMES:

We explore our cultural heritage.

DISCIPLINES:

Science.

CONCEPTS:

The world has changed because of ideas.
In a democracy of worth each individual has a responsibility.
We in the Enrichment Center Program have a special responsibility to society.
There is a relatedness in the universe.
Does man make the times or does time make the man?

LANGUAGE ARTS:

Great Books
You Are There
Writing for different purposes (science-precise meanings, scientific vocabulary)

CREATIVE ARTS:

Explore varied media of expression
Create
Plan
Produce
Evaluate
Visit art galleries
Attend concerts
Attend dramatic productions

MATHEMATICS:

School Mathematics Study Group

SCIENCE: (As a discipline in Grade 5)
Biology of man

SOCIAL STUDIES:

World Cultural background
Philosophical and scientific discussions (Plato, Aristotle, etc.)

Grade 6

AIMS:

Growth in ability to think: to plan, execute, evaluate; to utilize critical analysis and original thinking.

THEMES:

The world is still becoming —

DISCIPLINES:

Citizenship Education.

CONCEPTS:

The world is everchanging.

Concepts change.

Mathematics and other disciplines are employed in exploring unknowns.

Is this the best of all possible worlds?

What is our responsibility in a changing world?

How do we separate the true from the untrue?

LANGUAGE ARTS:

Great Books

Structure of Grammar

CREATIVE ARTS:

Individual projects

MATHEMATICS:

School Mathematics Study Group

SCIENCE:

Individual projects or chemistry or atomic structure

Grade 6

SOCIAL STUDIES: (As a discipline in Grade 6)

Structure:

- Basic Needs. Man has worked to meet common basic human needs and to satisfy common human desires and aspirations.
- Environment. Surroundings and conditions affect man's way of living, and man, in turn, modifies his external conditions. Included are physical, economic, social, and political environment.
- Social Systems. Social grouping of all kinds develops as a means of group cooperation in meeting individual and societal needs.
- Interdependence. Dependence on one another is a constant force among people everywhere.
- Cultural Heritage. Man's cultural environment is dependent on contributions of the past and exert a great influence on his ways of perceiving, thinking, and feeling.
- Democracy. Better social and personal life has developed for man through the long upward struggle, and there has emerged a set of values and social processes that make the framework of the ideals of democracy.

Method of Inquiry:

Contact with original sources; evaluation of written word; evaluation of contrasting viewpoints are essential.

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